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ABSTRACT

The pocket-sized guide book is intended for law enforcement and land management agencies responsible for land-based search and rescue missions and is also useful for outdoor leaders. The information in the book is based on two premises, that a search is an emergency situation and that a search is a classic mystery. The guidebook contains information about theories and principles of land searches, search and rescue resources, search planning and execution, investigation principles, interviewing instructions, theory of search and detection probabilities, lost subject behavior, establishing search area, clue orientation, search team organization and management, base camp administration and organization, briefing and debriefing, medical aspects of searches, suspending searches, and demobilization. The book also contains checklists to use in the field, including a list of search and rescue resources, interview form, tracking charts, a lost person questionnaire and information form, and a helicopter request form. The guide presents much information in tabular form and contains many illustrations. (SB)

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SEARCH IS AN EMERGENCY

A Field Coordinator's Guide for Managing the Search Function

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SEARCH THEORY IMPLEMENTATION IS THE REDUNDANCY THAT ASSURES SUCCESS WHEN SHORT-CUTS FAIL!

The Crucials:

1. Search is an emergency.
2. Search is a classic mystery.
3. Search for clues, not the subject.
4. Concentrate on aspects that are:
   - important to search success.
   - under control of a search manager.
5. Know if the subject leaves the search area.
6. Grid search as a last resort.

You are Working for the Lost Subject!

SEARCH IS AN EMERGENCY

Field Coordinator's Handbook for Managing the Search Function.

WRITTEN AND EDITED BY:
RICK LAVALLA, SKIP STOFFEL, BILL WADE

ARTWORK BY: RICHARD PARGETER

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DISCLAIMER

This manual is not a complete instructional manual for search management. It is not meant to replace field training by competent search leaders and experience. The authors, the Emergency Response Institute, the National Park Service, and the National Association for Search and Rescue take no responsibility for the use of this book or any information contained therein. Endorsement of specific equipment is not implied. It is the duty of every agency that has search and rescue responsibilities to obtain the knowledge necessary to perform effective, efficient search and rescue operations. The information presented in this course and in this publication will serve as the beginning outline and body of knowledge for proper search management.

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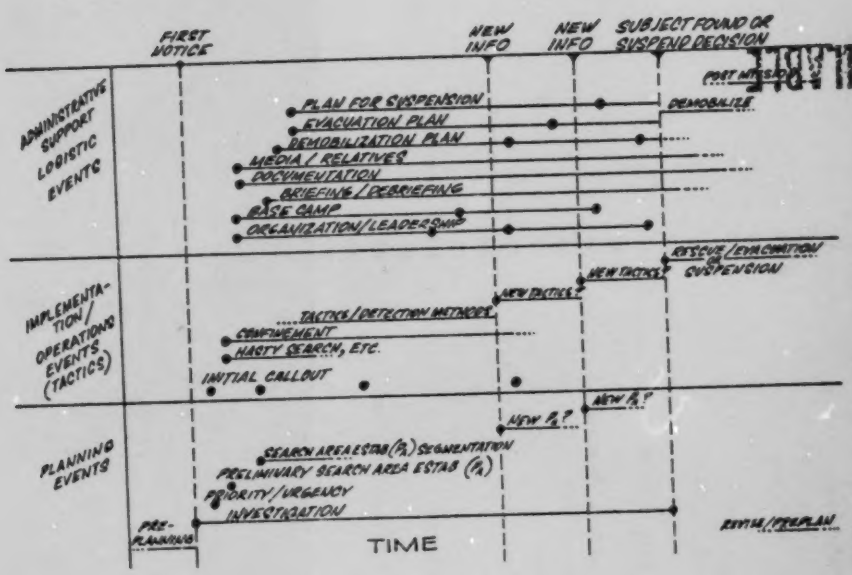


"Handling people need not be so difficult. All you need is inexhaustible patience, unfailing insight, unshakable nervous stability, an unbreakable will, decisive judgment, infrangible physique, irrepressible spirits and an awful lot of experience."
—Tacoma Mt. Rescue

Leadership

Leadership is an art. It is a way of influencing and directing people in such a way that you obtain their confidence, obedience, respect and loyalty.

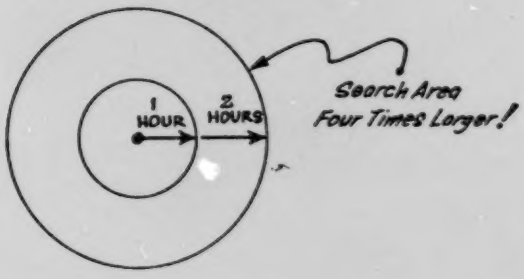
Essential Leadership Traits

1. **Integrity** - Be fair.
2. **Knowledge** - Know the SAR job, know your resources.
3. **Courage** - A mental quality that recognizes the fear of danger or criticism but enables a person to go on in the face of it with calmness and firmness.
4. **Decisiveness** - Reach a decision promptly and announce it clearly.
5. **Dependability** - You can be counted on to do your job, no matter what. You don't pull out.
6. **Initiative** - See what has to be done and start doing it. Set the example.
7. **Tact** - The ability to deal with others, without causing offense.
8. **Justice** - Again, be fair.
9. **Enthusiasm** - Sincere interest and exuberence in performing search and rescue (SAR).
10. **Bearing** - Although dress has no bearing on a rescue person's ability, a clean uniform, overall appearance and the personal conduct of each individual member inspires confidence (or the reverse) in the entire operation.
11. **Unselfishness** - Avoid putting your own comfort above others.
12. **Endurance** - The mental and physical stamina to stand pain, fatigue, distress and hardship.
13. **Loyalty** - We're all "Compadres" in this effort.
14. **Judgment** - The ability to weigh the facts and possible solutions and then come up with sound decisions.
15. **Guidance** - Insure that the assignment is understood, supervised, and accomplished.
16. **Efficiency** - Make the best use of your resources.
17. **Responsibility** - This is the name of the game.

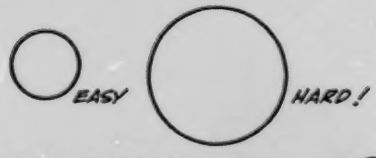
Remember—Efficiency is doing things RIGHT and Effectiveness is doing the RIGHT things RIGHT!

Theories and Principles of Land Search

1. **Search is an emergency.**
   a. Because:
      - The subject may need emergency care.
      - The subject may need protection from himself and/or the environment.
      - Time and weather destroy clues.
      - An urgent response lessens the search difficulty.
   b. It is often hard to *justify* urgency because a certain percent of lost people, if left on their own, would survive and walk out.
   c. A *quick response* means putting searchers into the field to minimize search area size. The search area size can grow larger with each hour.

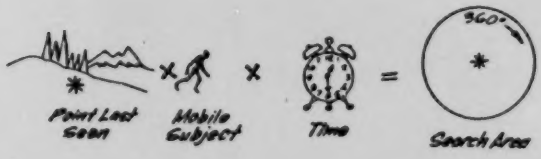


   d. The chances of success are directly related to search area size.



SO... HOW IS SEARCH AREA DETERMINED?

   e. *Search* area is the potential maximum distance traveled by the subject.

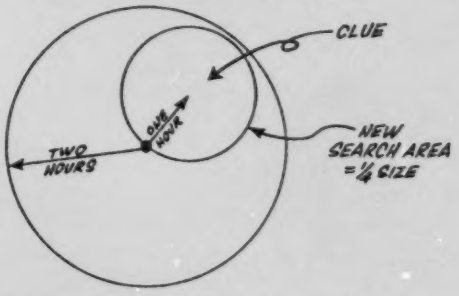


   f. Night-time gives searchers a unique opportunity to confine the subject while he is (usually) immobile.

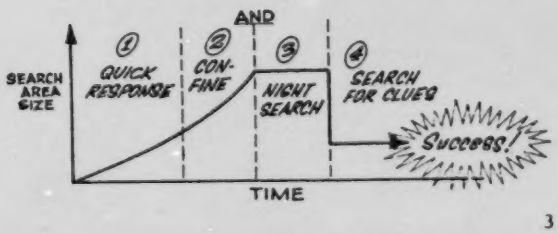
To respect the search subject's emergency, you must:

1. ***Respond urgently.***
2. ***Search at night.***
3. ***Mobilize and keep searchers in the field.***
4. ***Create an atmosphere of positive urgency.***

2. **Search is a classic mystery.**
   Finding a lost subject is like a plot in a Sherlock Holmes novel. All of the clues are there if the search manager properly investigates, interviews, and assimilates.
   a. You must know what clues to look for.
   b. Possible destinations must be determined.
   c. Points last seen must be identified.
   d. The missing incident must be recreated.
   e. The subject could return home or show up at friends, etc.
3. **Search for clues, not subjects.**
   a. There are more clues than subjects. Every subject on land leaves clues such as scent, tracks, and other disturbances.
   b. Clue detection substantially reduces search difficulty.



4. **Concentrate on aspects that are important to search success, under the control of a search manager.**
   It is a waste of time, energy, effort, and money to do otherwise!
5. **Know if the subject leaves the search area.**
   a. A search without a subject is nonsense.
   b. Search difficulty increases rapidly unless you confine the subject.
   c. Include prominent non-search areas, i.e., home, etc.
   d. Assign someone to do the "Bastard Search."
6. **Grid search as a last resort.**
   Because the cost/benefit is significantly less than for other techniques.



Search and Rescue Resources

Resource Evaluation

You must ask six basic questions to evaluate a resource's usefulness in an operation for a given mission:

1. **Availability?**
   a. Are they ready to respond?
   b. Are there any special requesting procedures or conditions?
2. **Response time after notification?**
   a. A measured response?
   b. An emergency response? (It is important to remember that search area size is time dependent).
   c. Are the resources on hand or immediately available? If not, what is the time lag?
3. **Capabilities?**
   Can the resource really perform the task quickly, safely, and efficiently?
4. **Limitations**
   a. Are they in "shape" mentally and physically?
   b. How proficient or effective is the resource?
   c. Special considerations—communications, language, radios.
   d. Competition—ego?
   e. Will they work with and for you?
5. **Qualifications**
   Is the resource really qualified as shown by training, past performance, and work record?
6. **Back-up resources**
   More than one plan necessitates more than one resource source.

What do SAR volunteers expect from the on-scene SAR Manager?

- ***An awareness and understanding of their capabilities and expertise.***
- ***To be given an idea of what they are expected to do (what is their mission).***
- ***A briefing on the overall plan of action.***
- ***An opportunity to provide input into the search plan, by having key volunteer leaders involved in planning sessions.***
- ***To be provided adequate briefings and on-going information.***
- ***To be adequately debriefed.***
- ***To be invited to constructive critiques.***

What does the on-scene SAR Manager expect from SAR volunteers?

- ***Organization.***
- ***Discipline.***
- ***Cooperation.***
- ***Advice.***
- ***High performance standards.***
- ***Proper clothing, equipment and the ability to be self-sufficient.***

A Format for Listing SAR Resources

Jon Gunson: Summit County Rescue Group, Colorado

List of Resources: You should complete an inventory of all the various resources which are available to you both locally and out of the area. This list should be comprehensive, accurate and regularly updated.

Resource Types: Some resources such as helicopters can be very useful with a number of different capabilities in the search operation. Most of your search resources, however, can be cataloged in one of the following general types. You should make certain that your requirements for a search can be satisfied in each of the following areas.

Strategy	Tactics	Method	Name of Resource	Phone
A. Management	Planning	Local staff trained volunteer, overhead team		
	Logistics	Local staff trained volunteer, overhead team		
	Investigation	Local staff law enforcement trained volunteer, overhead team		

Strategy	Tactics	Method	Name of Resource	Phone
A. Management cont.	Liaison	Local staff		
	Communications	Local staff trained volunteer		
	Support	Local staff trained volunteer		
B. Confinement	Road blocks	Law enforcement		
	Road patrols	Two wheel vehicles Four wheel vehicles		
	Trail blocks	Law enforcement, volunteers, climbing club, unplanned manpower		

Strategy	Tactics	Method	Name of Resource	Phone
B. Confinement cont.	Trail patrols	Hikers, horse, motorbikes, skiers, snowmobiles, all-terrain vehicles, dune buggies		
	Look outs	Volunteers, untrained manpower		
	String lines	Trained manpower		
	Camp-ins	Local volunteers		
C. Attractions	Sight	Fire, smoke, search lights, aircraft, weather balloons		
	Sound	Sirens, fog horn, guns, power megaphone, aircraft		

Strategy	Tactics	Method	Name of Resource	Phone
D. Clue finding	Interrogation	Law enforcement trained volunteers		
	Visual tracking	Trained volunteers		
	Tracking dogs	Trained volunteers		
E. Clue/Subject finding	Scratch search	Trained volunteers		
	Sign cutting	Trained volunteers		
F. Subject finding	Team search	Trained teams		
	Line search	Trained teams		

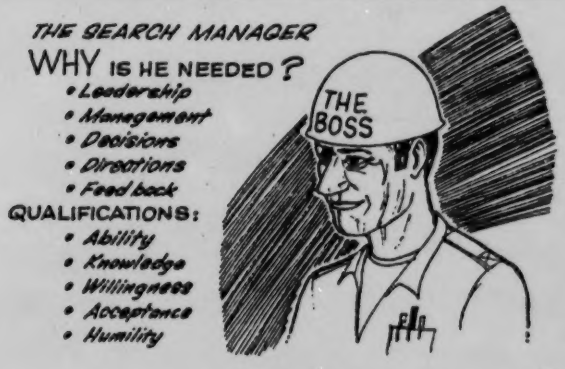
Strategy	Tactics	Method	Name of Resource	Phone
F. Subject finding cont.	Water search	Boats, kayakers, rubber rafts, divers		
	Special hazard search	Winter/mountaineers avalanche teams, cavers, mine experts, rock climbers		
	Air search	Helicopter, fixed wing		
G. Communication	Radio	VHF, UHF, CB, amateur relays		
	Landline	Public phone, radio, telephone, field phones, teletype, watts, FTS, autovon		

Strategy	Tactics	Method	Name of Resource	Phone
H. Transportation	Land	Bus, truck, second vehicle, four wheel vehicle, snowmobile, snowcat, all terrain vehicles		
	Air	Helicopter, fixed wing		
	Water	Boats		
I. Support	Pool/water	Volunteers, Salvation Army, Red Cross, field kitchen, catering service		
	Shelter	Volunteers, Red Cross, Civil Defense		
	Medical	First-aid, EMT, nurse, paramedic, doctor		

Strategy	Tactics	Method	Name of Resource	Phone
I. Support cont.	Sanitary	Port-a-potty, field latrine		
J. Rescue and Recovery	Non-Technical	Litter teams, 4 wheel, snowmobile, helicopter, ambulance		
	Technical	Teams of: Rock rescue, mine rescue, cave rescue, avalanche rescue; helicopter, underwater recovery teams.		
K. Other				

Planning/Searching Data

Planning Data	Searching Data
Information required for adequate search planning strategy 1. Category of subject (child, hunter, elderly, etc.) a. Detectability b. Travel aids c. Distance traveled d. Survivability 2. Point last seen or last known position a. Clues preservation b. Exact location c. When d. Identity of last person to see subject 3. Circumstance of loss a. Trip plans b. Activity c. Why separation d. Events up to loss 4. Trip preparation a. Equipment b. Experience 5. Physical condition of subject a. Before b. At time of loss 6. Mental condition of subject 7. Personality traits which may influence potential behavior 8. Weather a. Before b. Now c. Predicted 9. Terrain analysis a. Travel aids b. Hazards c. Barriers	1. Name to call 2. Shoe print description 3. Clothing worn 4. Equipment possessed 5. Potential clues



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First Notice

Initial contact with reporting party

1. Proper attitude is important.
2. Name, how and where to recontact.
3. Talk to reporting party personally.
4. Initiate some action.

Initial information needed

1. Name, address of subject(s).
2. Missing how long?
3. Activity.
4. Equipment possessed by subject(s).
5. Number of subjects.
6. Age of subject(s).
7. Sex of subject(s).
8. Physical/mental/emotional condition.
9. Experience/ability.
10. General terrain.
11. Point last seen or last known position (PLS or LKP).
12. Weather.

Get all information necessary to determine:

1. If there is a problem.
2. How serious it is or could get.
3. Where is it.
4. Who is involved.
5. How did it happen.
6. When did it happen.
7. What are you going to do now.

It is impossible to get too much information at the First Notice!

Evaluation of the problem

1. Evaluate initial contact (source).
2. Evaluate the initial information.
   a. Circumstantial
   b. Second hand
   c. Eyewitness
3. Consider the facts.
4. Consider the probabilities.
5. Consider the possibilities.
6. Combine information objectively.
7. Get more information—initiate intensive investigation.
8. Protect clues (PLS, LKP, scent articles, tracks).

Some kind of response should always happen immediately!
SEARCH IS AN EMERGENCY!

THE FIRST NOTICE

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Lost Person Questionnaire/Check List

Missing Person's Last Name: _____

Where Last Seen: _____

When Last Seen: _____
(Date) (Time)

Time _____ Today's Date _____

Mission No. _____ S.O. O/R No. _____

Officer _____

Data Taken By _____

Taken By Telephone _____ In Person _____ S.O. ___

Name of Person Making Report: _____

Present Location _____

Present Phone Number _____

Where can he be reached
for further information _____

Home Address _____

Home Phone _____

Occupation _____

Business Phone _____

Relationship to Missing Person _____

All Others in Party:

1. Name _____
   Address _____
   Phone No. _____
   Relationship _____
2. Name _____
   Address _____
   Phone No. _____
   Relationship _____

US

3. Name _____

Address _____

Phone No. _____

Relationship _____

4. Name _____

Address _____

Phone No. _____

Relationship _____

Name of Missing Person:

Local Address _____

Local Phone _____

Home Address _____

Home Phone _____

Occupation _____

Nicknames _____

Aliases _____

Date of Birth _____ Age _____

A. Physical Description:

Height _____ Weight _____ Build _____

Hair Color _____ Length _____

Sideburns _____ Beard _____ Balding _____ Mustache _____

Eye Color _____ Glasses _____

Complexion _____

Facial features, shape _____

Any distinguishing marks, scars, etc.? _____

_____

Race _____ General Appearance _____

Mental Condition _____

B. Clothing:

Shirt or sweater: Style_____ Color_____

Pants: Style_____ Color_____

Jacket: Style_____ Color _____

Rain Gear: Style_____ Color _____

Shoes: Style_____ Color _____

Sole Type _____

Is a sample of sole type available? _____

Where: _____

Hand Gear: Style_____ Color _____

Gloves: Style_____ Color _____

Glasses (Regular or Sun)_____ Style _____

How Necessary?_____ Contacts _____

Any extra clothes/shoes? _____

Scent articles available?_____ Where?_____

C. Personal Articles: (believed to have in possession)

Cigarettes_____ Brand _____

Cigars_____ Brand _____

Pipe_____ Type_____ Brand _____

Matches_____ Lighter_____ Type _____

Gum_____ Candy _____

Lunch or known food items _____

Other _____

D. Equipment:

Pack: Style _____

Brand_____ Color _____

Tent: Style _____

Brand_____ Color _____

(D. Equipment cont.)

Sleeping Bag: Style _____

Brand _____ Color _____

Food: What kind _____

Brands _____

Amount _____

Water: Canteen Style: _____ Capacity _____

Flashlight _____ Matches _____ Knife _____

Map _____ Compass _____

Ice Axe _____ Brand _____ Covers? _____

Snow Shoes: Type _____ Brand _____

Binding Type _____

Tour Skis: Brand _____ Length _____

Color(s) _____

Binding Type _____

Binding Brand _____

Ski Wax: Type _____ Brands _____ Colors _____

Ski Poles: Type _____ Length _____

Color(s) _____

Brand _____

If rental equipment, rental markings? _____

Ropes/hardware _____

Fishing equipment _____ Brands _____

Camera _____ Brand _____

Money _____ Amount _____

Credit cards _____

Firearms: Type _____ Brand _____

Ammunition _____

E. Trip Plans: _____

Going to _____ via _____

Purpose _____

How long? _____ How many in group? _____

Group affiliation _____ Transportation _____

Started at _____ When _____

Car located at _____ Type _____

License No.: _____ Verified: _____

Alternate car at _____ Type _____

License No.: _____ Verified: _____

Pickup/return time _____ Where _____

Any alternate plans/routes/objectives discussed? _____

_____

F. Last Seen Details: _____

When _____ Where _____

By Whom _____

Present? _____

If not, location _____

Phone _____

Weather _____

Going which way _____

How long ago _____

Special reason for leaving? _____

Unusual comments upon leaving? _____

G. Experience: _____

Familiar with area? _____ How recently _____

If not local, what other areas of experience _____

_____

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(G. Experience cont.)

Taken outdoor classes_____ Where _____

When _____

Taken First-Aid Training_____ Where_____

When _____

Been in Scouts_____ Where _____

When _____

Military Services? _____

How much overnight experience? _____

Ever been lost before?_____ Actions _____

Ever go out alone?_____

Stay on trails or go cross country? _____

How many long trips before _____

If not regular hiker, general athletic interests and ability _____

_____

_____

H. Contacts person would make upon reaching civilization:

Home address _____

Phone _____ Anyone home? _____

Local contact?_____ Phone_____

I. Health—General Condition:

Any physical handicaps _____

Any known medical problems _____

Knowledgeable Doctor _____

Phone _____

Any known psychological problems_____

Knowledgeable Person _____

Phone _____

(I. Health—General Condition cont.)

Taking prescription medication _____

_____

Doctor _____

Consequence of loss _____

Amount carried _____

Eyesight without glasses _____ Spares? _____

J. Actions Taken So Far:

By Friends/Family: When _____

Results _____

By Sheriff: When _____

Results _____

By Forest/Park Service: When _____

Results _____

Missing persons report filled: When _____

Where _____

All points bulletin issued: When _____

Authority _____

K. Personality Habits:

Smoke _____ How often _____

What _____ Brand _____

Drink _____ Brand _____

Drugs _____

Hobbies or interests—fishing, flowers, climbing, photography?

_____

_____

Does person work for spare money? _____

Outgoing or quiet; group person or loner? _____

(K. Personality Habits cont.)

Evidence of leadership _____

Ever been in trouble with law?_____ Now? _____

Hitchhike often?_____ Accept rides? _____

Feelings towards grownups_____ Hippies_____

Any current family/girl friend problems? _____

Religion_____ Serious? _____

What does person believe in? _____

What does person value most? _____

Who is person closest to in family: _____

In general: _____

Where born and raised? _____

Any history of depression, running away? _____

Status in school_____ Draft_____

Who last talked at length to person?_____

Where_____ Subject? _____

Any recent letter? _____

Give up easily or keep going? _____

Will person hold up and wait or keep moving? _____

_____

L. For Children:

Afraid of Dogs?_____ Horses? _____

Afraid of dark? _____

What training regarding what to do when lost? _____

What actions when hurt? Cry? Carry on? _____

Talk to strangers: accept rides? _____

Active type or lethargic? _____

M. For Groups Overdue:

Any personality clashes in group? _____

Any strong leader types not actually the leader? _____

What is competitive spirit of group? _____

What would be actions if separated? _____

Any persons especially close friends? _____

What is experience of leader and rest of group? _____

N. Family—To prevent press problems:

Father's Occupation _____

Parents separated or similar problem _____

Family's desire to employ special assistance _____

Name, address, and phone of father/mother/husband/wife/son /daughter to notify if found in good condition: (Give information for the most appropriate kin to contact when found.)

Name _____

Address _____

Phone _____

Relationship _____

Person to notify if found in very poor condition or dead: (should be friend, relative, or minister of next-of-kin)

Name _____

Address _____

Phone _____

Relationship _____

DEVELOPING A PLAN

1. Where is the subject?
   Case histories, statistics, models, deductive reasoning, intuition
2. How can I find the subject?
   PASSIVE - Confinement, perimeter cutting attraction, road blocks
   ACTIVE - Trackers, dogs, aircraft, hasty teams, grid teams

Investigation

General Principles of Investigation

1. Assemble a complete profile.
   - Let it offer direction, but...
   - Don't form early opinions and then collect info to justify or support your opinions.
2. Clue seeking is an on-going process.
   - It doesn't stop until the subject is found.
3. Know the minimum planning/search data that is required.
4. Never minimize the value of a clue.
5. No one person can adequately gather the facts.

The Priorities for Investigation

1. Investigation should begin *immediately* with the First Notice.
2. Investigation should be continuous until the subject is located or the mission is suspended (in this case, investigation probably will continue on a limited basis.)
3. Organizationally, the investigation should be a separate function and conducted by professionals.
4. It is easier to dismiss information that you have when it is not needed than to find out too late that you need information, or to receive it after the need is critical.

Criminal Possibilities

1. Every lost person incident must be treated as if it has criminal possibilities until proven otherwise. Possibilities include:
   a. Staged incident
   b. Homocide/negligence
   c. Kidnapping
2. If subject is found dead or seriously injured, crime scene protection measures should be implemented.

AS THE MANAGER -

- YOUR PRIMARY JOB
  - IS TO GUIDE THE AFFAIRS OF OTHER PEOPLE
- YOUR PRODUCT
  - IS THE RELEASED ENERGY OF OTHER PEOPLE
- YOUR PERFORMANCE
  - IS MEASURED BY THE ACCOMPLISHMENTS OF OTHER PEOPLE

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Investigation Table

Information ("Lead" or Clue)	Source
1. Subject profile at point last seen	1. Companions
2. Equipment possessed by subject	2. Companions, relatives, friends
3. Intended route, trip plans	3. Companions, relatives, friends
4. Actual route, subsequent sightings	4. Witnesses from area
5. Subject experience	5. Companions, friends, co-workers, relatives, past companions
6. Physical condition	6. Companions, friends, relatives, doctor, clergyman, co-workers
7. Mental condition	7. (Same as #6)
8. Recent changes in behavior, crisis	8. (Same as #6)
9. Habits, drugs, medicines, etc.	9. (Same as #6)
10. Mental attitude—How will subject react when lost?	10. (Same as #6)
11. Relationships with wife, children, parents, friends, co-workers	11. (Same as #6)
12. Criminal history	12. Relatives, friends, co-workers, local law enforcement
13. Financial situation, debts, withdrawals, etc.	13. Relatives, friends, financial institutions, creditors
14. Confirmation of equipment (footwear—sole pattern, etc.)	14. Relatives, friends, store where purchased
15. Photographs	15. Relatives, friends, school
16. Interests, hobbies, what might attract subject	16. Relatives, companions, friends, co-workers
17. Background check of subject's companions	17. Relatives, co-workers, other companions, law enforcement

Interviewing

Do's	Don'ts
1. Interview persons with first-hand knowledge as quickly as possible. 2. Interview witnesses separately. 3. Interview witnesses face-to-face. 4. Always assume that everyone will have something to contribute, if asked the right questions in the right way. 5. Be aware that some people are looking for publicity or to be the "center of attention." 6. Be aware that witnesses have different interests, conclusions, biases and past experiences that may influence their answers. 7. Conduct interviews in an informal, relaxed, comfortable setting and in private, free from interruptions. 8. When possible, work in pairs while interviewing people. 9. Use a recorder when possible and inform the witness when you are recording. 10. Be careful about writing down responses—you may be writing when you should be listening. 11. Try to set a person at ease, relax them. Start off with general conversation. *cont.*	1. Interrogate or cross-examine. 2. Assume anyone is telling the truth or fully cooperating. a. May be a crime involved. b. Witness may be suspicious of or afraid of interviewer. c. Rivalry or jealously may exist. d. Relatives may be embarrassed. e. Witness may not understand complexity of situation or relevance of information needed. f. Natural tendency to minimize faults, deficiencies and shortcomings of subject. 3. Let information lead to premature conclusions. 4. Form your conclusion and then gather information to support it. 5. Assume that one person can give you all the information. 6. Be concerned about conflicting information. The differences must be evaluated and the information *verified*. 7. "Program" people to give erroneous answers by the way you ask the questions. Questions must reinforce, *not distort*, the memory. *cont.*

(Do's cont.)	(Don'ts cont.)
12. Convey a sense of controlled urgency and concern, but not excitement. You must convey that you are taking action, even if you feel the situation is not urgent. 13. Try to understand the person and the mentality you are dealing with. If you have to interview a "hippie" and don't relate to them, get someone who does. 14. When interviewing children, compensate for the height difference—get down to eye level with them. 15. Control your own biases. 16. Be a good listener. 17. As necessary, paraphrase or summarize an answer to make sure you understand it. 18. Check validity of an answer by asking it differently later, or by asking questions for which you know the answers. 19. Be alert to key words or phrases—especially if repeated. 20. Consider reducing the interview to a written statement—particularly if the interview has been recorded. 21. If more than one interviewer is used, they must get together to compare information, reactions, "gut feelings," discrepencies and missing information.	8. Interrupt an answer or be thinking ahead to your next question. Wait until the answer is complete to clarify confusing points or to phrase your next question. 9. Be afraid to use the "pregnant" pause. This often prompts the witness to volunteer more information. 10. Put the witness on the *defensive*. 11. Jump around in the chronology of the incident. 12. Overlook the possibilities of using hypnotism, polygraphs, physical stress evaluators, etc.

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Interviewing is the major tool for investigation!

What Information to Get

Information needed generally is in one of two categories:

1. **Searching Data**—needed by searchers to know where to look for.
2. **Planning Data**—needed by the manager to determine the best strategy and tactics.

Who to Interview

Among those who may have information critical to the outcome of the search are:

- Companions who were with the lost subject.
- Parents, wife, husband, children.
- Other relatives.
- Close friends.
- Co-workers.
- Schoolmates, school counselors.
- Family doctor.
- Family clergyperson.
- Business associates.
- Local law enforcement officials.
- Persons from appropriate banks, businesses, etc.
- Persons from stores where equipment was obtained.
- Other witnesses from the search area who may have seen the subject.
- Persons who might have transported subject to or from the search area.
- Family, acquaintances, co-workers, etc. of the companions who were with the lost subject.
- People who know the search area.

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Information on Subject—Where to get it.

For an emergency rescue response, you will probably use only the first two of these. The others come in handy during searches.

Direct from reporting party	Detain, hold on phone, get phone number, identification, location, auto, photos, maps, return to scene, where staying.
Reconnaissance	Hasty team, geographical viewpoints, loudhailer, hand signals, chopper, polaroid, backcountry (trail crew).
Auto	Returned?, equipment, notes, maps, leave note to "call Ranger or sheriff."
Accommodations	Returned?, equipment, notes, maps, leave note to "call Ranger or sheriff."
Home	Returned?, equipment, notes, maps, leave note to "call Ranger or sheriff."
Place of work	Returned?, equipment, notes, maps, leave note to "call Ranger or sheriff."
Friends	Returned?, plans, physical and mental condition, habits, drugs.
Relatives	Returned?, plans, physical and mental condition, habits, drugs.
Co-workers	Returned?, plans, physical and mental condition, habits, drugs.
Registration cards	Returned?, plans, experience, equipment, who to contact, etc.
Registration cards	Of other parties who may have seen subject.
Wilderness permits	Of other parties who may have seen subject, subject's plans, address, etc.
On-scene clues	Track, equipment, candy wrapper, dog scent articles.
Wanted posters	Mailed to wilderness permit holders in same area, at trailheads, put up in stores.
Trailheads	Interview hikers.
Visitor center	Interview staff, put up "wanted" poster.
Summit registers	For subject, possible witnesses.
Bus drivers, etc.	Let subject out where?, make announcement on bus.
Local medical facilities	Interview staff, local record check.
Local law enforcement	Separate the overdue from the emergency.
Campgrounds	Check registers, fee receipts.
Weather records	Local and regional records.

Information about Incident—Where to get it.

Here are some categories and specifics to look for when talking to witnesses. Not all of these are necessary for the initial response.

What happened?	Overdue, cries for help, crime, slipping, stuck, cold, thirsty, fallen, injured, dead, symptoms, walking wounded, equipment and personnel on scene, instructions by or to subjects, reasons for overdue.
Where?	Very important (show maps, photos to witness). On ground, how far up or down, what climb, what pitch, in water, on bank, what trail, where last seen, headed which direction, landmarks, mileage, type of terrain, route taken before accident, afterwards, washed downstream, how long did witness take to get out, car parked, was he staying here.
When?	Last seen, supposed to return, injured, ran out of water, symptoms appeared, fresh tracks or old, did storm hit (match itinerary to the weather).
Who?	Name, age, sex, weight, etc., address, phone, parents, friends, condition (mental and physical), vehicle, skills, experience, personnel with subject, backcountry personnel in area, kind and size of shoes (sole), clothing types and equivalent and colors, complete list of equipment.
Why?	Family problems, drugs, avalanche, rockfall, illness (hypothermia).

Environmental Information—Where to get it.

Current weather forecast:	Can they spend the night? three day storm? lightning? wet rock? rising water?
Marginal forecast:	Call County Sheriff upwind or flight service station.
Daylight:	See dawn/dusk tables in SAR manual or add 15 minutes (approximately) to sunset and sunrise in local paper.
Moonlight:	When will it rise, what phase, walk by, fly by.
Temperatures:	Usually much warmer on valley walls than on floor or rim.
Terrain for approach and evacuation:	Maps, photos, etc. See "Where to get it."
Picking lowering point:	Photos, reconnaissance, flares.

Some Guidelines for Conducting an Interview

1. Introduce yourself and state the exact purpose of the interview.
2. Create a comfortable atmosphere (what climate would you need to reveal things about yourself?)
3. Start with non-threatening questions.
   a. Reduces tensions.
   b. Shows you care about his/her feelings.
4. Understand his/her need to express emotional feelings.
5. Know yourself and how you come across—you get back what you project.
6. Know what you are after—have a general plan of attack.
7. Prepare the interviewee for personal questions.
8. LISTEN! LISTEN! LISTEN!—you will learn nothing if you do all the talking.

Use all of the following techniques to get the person to start, and continue talking.

1. Use structured questions that require only a simple one or two word response to clarify a point.
2. Use unstructured questions (Questions such as Why . . . ? How about . . . ? What do you think may have happened? etc.) to get the interviewee thinking and talking about the subject of interest.
3. Once you have the person talking, encourage him to continue. *Listen!*
   a. Give no implicit message to stop.
   b. Show acceptance (nod, Uh-Huh, yes . . . , please continue, etc.)
   c. Silence:
      - forces him to continue.
      - one time out of three, he will add additional information and it will probably be the most important information received.
4. To probe an area of interest (particularly a touchy or sensitive area):
   a. *Restate words* that the person just used.
   b. *Summarize back* what you perceived the person to communicate.

Some kind of response should always happen immediately.

SEARCH IS AN EMERGENCY – even if it is no more than stepping up the planning for the increased potential for a more serious problem.

Determining the Search Urgency

Urgency Chart

On the following chart, the lower the numerical rating of the factor, the higher that the *relative* urgency becomes.

Subject Profile	Rating
Age	
• Very young	1
• Very old	1
• Other	2-3
Medical Condition	
• Known or suspected injured or ill	1-2
• Healthy	3
• Known fatality	3
Number of subjects	
• One alone	1
• More than one (unless separation suspected)	2-3
Weather profile	
Existing hazardous weather	1
Predicted hazardous weather, (8 hrs. or less)	1-2
Predicted hazardous weather, (more than 8 hrs.)	2
No hazardous weather predicted	3
Equipment profile	
Inadequate for environment	1
Questionable for environment	1-2
Adequate for environment	3
Subject experience profile	
Not experienced, does not know area	1
Not experienced, knows area	1-2
Experienced, not familiar with area	2
Experienced, knows area	3
Terrain and hazards profile	
Known hazardous terrain or other hazards	1
Few or no hazards	2-3

In addition, the more serious the previous incidents were, the more time that has elapsed since the subject "went missing," and the more pressure created by external influences, the greater the urgency becomes.

The combination of the factors affecting urgency will help determine not only how quickly to respond, but the nature and level of response, as well. Some kind of response should always happen immediately—even if it is only an increase in planning for the higher potential that the problem will become more serious.

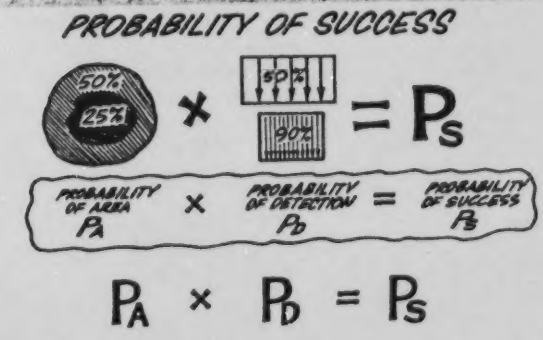
SEARCH IS AN EMERGENCY!

The Theory of Search Probabilities

Strategy and Tactics — **POA X POD = POS**

1. **Basic probability equation**
   Basic equation: **POA X POD = POS**
   a. POS represents probability of finding the subject or clue (Success).
   b. POA represents probability of subject or clue being in the search area.
   c. POD represents probability that the subject or clue will be detected under given conditions if it is in the search area.
2. **Why do you need a measure of success?**
   You must know how effective you have been, or can be, in order to:
   a. Distribute or redistribute resources.
   b. Search or research a search area segment; increase or decrease the size of a search area segment; expand the search area.
   c. Decide if or when to suspend an unsuccessful search.
   d. Rationalize your actions to the family, media, or higher authority.
   e. Defend yourself in potential litigation.
3. **The case for quantification**
   a. In one way or another we always evaluate our chances or our efforts. In the past we have done so subjectively—using abstract words to state our evaluation.
   b. By using *numbers* to express relative indications of probabilities, the advantage is produced of being able to manipulate combinations and *calculate* results of alternatives. *You cannot do this with words!*
   c. In using probabilities we must remember that they are like "the odds" or "trade-offs." The numbers are not to be thought of as absolutes.

In probability calculations, 70% by itself is meaningless. It must be thought of as being relatively better than 60%, but not as good as 80%.



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Lost Subject Behavior

Factors affecting a lost subject's behavior in general

1. **Biological cycles**—were things generally going well for the person or poorly?
2. **General state of health**—recent illness, poor condition, disease, lack of sleep.
3. **Experience**—past experience in outdoors, can they operate efficiently when out of their comfort zone, etc.
4. **Physiological effects of the environment**—heat, cold, altitude, precipitation.

Factors that may prove crucial in revamping a search plan

1. **Ability of the subject to seek or build shelter, including fire**—detectability of fires as opposed to difficulty of spotting someone in a shelter.
2. **Discarded equipment or clothing**—clues that point to a deteriorating condition.
3. **A "do-nothing" attitude**—an overwhelming sense of abandonment resulting in subject doing nothing to aid in their rescue.
4. **Will subject be detectable?**—is subject expected to be lying down, under shelter, wearing bright or drab clothing, hiding.
5. **Availability of travel aids in the search area**—avenues of little resistance which allow easy travel.
6. **Weather and visibility**—if they confine the missing subject's movements it may make confinement easier.

Mental impact on the subject

1. It may be helpful to find out all you can about the subject's past and current personality.
2. Try and place yourself in the lost person's shoes.
3. Compile a subject profile and study the known as well as the unknown.

General categories of lost person's behavior characteristics

1. **Children 1-3**
   - tend to wander aimlessly with no specific objective
   - will find a place to lay down and go to sleep
2. **Children 3-6**
   - more mobile, definite interests, will try to return home
   - will try to find sleeping spot and some will not talk to strangers
3. **Children 6-12**
   - usually oriented to familiar surroundings, intentionally run away or hide, usually come back at dark, same fears as adults
4. **Elderly** (above 65 years of age)
   - often senile, easily attracted, mental orientation is in the past, and pose same supervision problems as young children
   - often hard of hearing, poorly clothed, and tend to exhaust themselves
5. **Mentally retarded** (all ages)
   - same as children 6 to 12, won't respond to spoken name
   - will often hole up for days, no impairments, but don't help themselves

6. **Despondents**
   - often seek solitude, within sight or sound of civilization
   - tend to be near prominent locations and feel intruded upon
7. **Hikers**
   - rely on trails entirely for navigation, develop problems where trail is obscured or covered
   - areas of confusion or cutting switchbacks often the cause
8. **Hunters**
   - concentrate on game not navigation, often led into exhaustive states in very rough, steep terrain and vegetation
   - overextend into darkness and are typically unprepared
9. **Cone pickers, berry pickers, mushroom hunters, etc.**
   - poor survival risk, generally unprepared, attention focused on ground, and attempts to find their way usually get them further into trouble
   - intentions are to stay in one location
10. **Fishermen**
    - high percentage boat oriented, usually caused by slipping or being swept off of feet, often a recovery
11. **Climbers**
    - well-equipped, stay on designated routes, usually caused by weather, falling debris, or avalanche related.

General information relevant to the prediction of behavior

The following is a summary of the major points that must be considered when trying to predict an individual's movements or whereabouts.

1. **Category and circumstances of the loss**
   - children are different from hikers, etc.
   - the elements of the loss contribute greatly in prediction.
2. **Terrain**
   - flat terrain generally yields different travel distances than mountainous.
   - the area should be examined for barriers, escape routes, confusing drainages or ridges, etc.
3. **Personality**
   - consider the aggressive person versus the ponderer or pessimist.
   - has a substantial effect on the persons ability to survive.
4. **Weather**
   - restricts the subject's movements.
   - is a principle contributor to hypothermia.
   - critical time factors may call for increased efforts.
5. **Physical Condition**
   - are capabilities encumbered or not.
   - a poor condition means an increased susceptability to hypothermia.
   - has a direct bearing on the distance a subject will travel.
6. **Medical Problems**
   - anything that could possibly precipitate abnormal behavior.
   - could have a direct bearing on the distance a subject could travel.
   - weak heart, diabetes, allergies, medication, etc.

Establishing the Probable Search Area

Establishing the Probability of Area (POA) is the most crucial, critical step in preparing a search plan!

Five Methods of Establishing the Probable Search Area:

1. **Theoretical Search Area**
   The maximum possible distance that the subject could have traveled.
   Theoretical Search Area = πR^2 ($\pi = 3.14$)
2. **Statistical Search Area**
   Reflects the distances that other subjects of the same category have traveled, plus patterns of lost subject behavior. (See tables on pages 36, 37, and 38.)
3. **Subjective Search Area**
   Evaluation of the limiting factors that exist for the specific incident and geographic location. Consider the following:
   a. Natural barriers, and terrain features
   b. Physical clues found
   c. Historical data of the area from case histories
   d. Gut feeling or intuition based upon the special circumstances.
   e. Physical and/or mental limitations of the subject.
4. **Deductive Reasoning Search Area**
   Similar to the subjective method, a process of reasoning going from known general facts, and logically progressing to specific facts not known previously.
   Search is a Classic Mystery
5. **The Mattson Method of Group Consensus Search Area**
   A "voting" method based on personal experience, and personal interpretation of relevant facts by operations leaders, or key SAR resource people with extensive search experience.

Probability Evaluation of Search Areas

	Area or Route				
Evaluator	**A**	**B**	**C**	**D**	**Total**
LaValla	25%	25%	25%	25%	100%
Wade	70%	10%	10%	10%	100%
Brady	45%	35%	10%	10%	100%
Stoffel	60%	20%	10%	10%	100%
Total	200%	90%	55%	55%	
Divided By:	4	4	4	4	
Average	50%	22.5%	13.7%	13.7%	

(Each evaluators lines must total 100%.)

Although perhaps not as formal as the system presented above, a form of this method has probably been used throughout the country for years, (Consensus of Opinion). It is an excellent concept because it gives equal weight to all perspectives.

NEVER SEARCH PLAN BY YOURSELF!

PROBABILITY ZONES (miles from point of last seen)

Sarda - Syrotuck 1977

	Hill or Mountainous Terrain					Flat Terrain				
	Median	25%	50%	75%	Max. Zone	Median	25%	50%	75%	Max. Zone
Children 1-6 yrs.	.3 DN	.1 UP .4 DN	.5 UP .5 DN	1.5 UP 1.4 DN	89% 1.6 UP 2.6 DN	1.2	1-1.6	.6-1.7	.5-2.1	92% 0-2.2
Children	1.6 DN	1.0 UP 2.0 DN	.5 UP 2.1 DN	2.0 UP 4.0 DN	92% 2.6 UP 4.1 DN	1.2	.8-1.2	.7-2.0	.2-2.2	92% 0-3.0
Elderly	1.2 DN	.5 DN 1.8 DN	0 2.4 DN	.4 UP 2.6 DN	90% 1.0 UP 3.0 DN	1.0	.8-1.0	.7-1.2	.1-1.3	93% 0-3.0

PROBABILITY ZONES cont. (miles from point of last seen)

Sarda - Syrotuck 1977

	Hill or Mountainous Terrain					Flat Terrain				
	Median	25%	50%	75%	Max. Zone	Median	25%	50%	75%	Max. Zone
Hikers	2.5 DN	2.0 DN 3.0 DN	.6 DN 3.6 DN	.4 UP 6.1 DN	83% 4.0 UP 6.0 DN	2.0	1.4-2.4	1.0-3.2	.2-3.3	94% 0-4.0
Hunters	2.0 DN	1.8 DN 2.8 DN	.7 DN 3.1 DN	.8 UP 4.0 DN	93% 3.0 UP 6.0 DN	1.6	1.0-1.6	.9-2.2	.1-2.3	89% 0-3.0
Misc.	1.6 DN	.6 DN 1.6 DN	0 3.0 DN	1.4 UP 3.1 DN	84% 2.5 UP 3.2 DN	1.6	1.1-1.6	.5-1.8	.1-2.8	89% 0-4.0

SUBJECT BEHAVIOR: Evaluation of Circumstance of Loss

Known Location	
1. Followed a road, pathway, or trail	34%
2. Went cross-country	33%
3. Went down a drainage or path of least resistance	25%
4. Found in a hazardous area	8%
En Route	
1. Stayed on a path of trail (perhaps the wrong one)	22%
2. Left the main trail:	61%
a. Took a short-cut of any sort	34%
b. Headed for sights or sounds of civilization	22%
c. Became lost in heavy brush	5%
3. Victim of hazardous areas	11%
4. A medical problem near or on the trail	5%
Wilderness	
1. Found and stayed on travel aids (pathways, trails, etc.)	62%
2. Remained in heavy brush or timber	23%
3. Headed for the sights or sounds of civilization	8%
4. Were victims of hazardous areas	4%

SUBJECT BEHAVIOR DETECTABILITY

Easily Detected	Weather: Good	Bad	Used Travel Aids
Small Children (1 - 6 years)	90%	75%	57%
Children (6 - 12 years)	65%	10%	67%
Hunters	83%	66%	52%
Hikers	75%	67%	73%
Misc. outdoor persons	75%	50%	30%
Elderly	59%	10%	47%

SUBJECT SURVIVABILITY (% perished)

	Weather: Good	Bad
Children	4%	66%
Adults	11%	53.3%
Elderly	35%	67.0%

Dead within:	1-Day	2-Days	3-Days	4-Days	More than 5-Days
	50%	24%	9%	9%	8%

These three charts were extracted from:
"Lost Persons Behavior", Bill Syrotuck, 1976.

Why limit the search area?
The smaller the area that must be searched, the less time will be required to effectively cover it. In addition, the number of searchers required will be less and the chance of rapid subject recovery will be good. With current manpower constraints and limited resources, the efficient search manager really has no other viable alternative.

Confinement Tactics

Confinement is an initial tactic procedure used to limit the probability of area.
It is imperative that an effort be made to establish a search area with specific boundaries beyond which the missing subject has not passed.

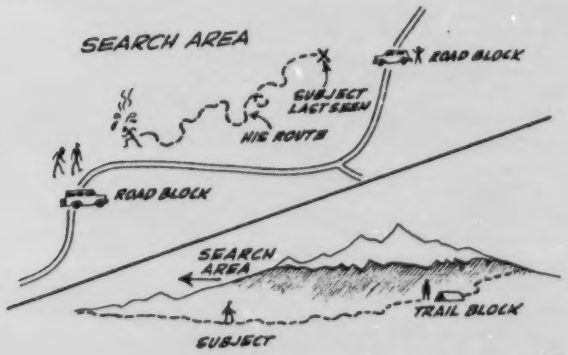
A search area without a missing subject is NONSENSE!

Once the search area has been defined, numerous methods can be employed to insure detection should the subject pass through the perimeter.

1. If the subject is presumed to be mobile, this procedure requires prompt initial reaction combined with an accurate assessment or analysis of the surrounding terrain. Rapid confinement presents no conflict with other search methods and dramatically reduces the chance of an expanded massive search area.

Confinement is not possible in all cases.

2. **Confinement Methods**
Road Block, Trail Block, Camp-ins — Any roads or clear pathways provide routes by which a subject can depart an area. Many subjects have walked out on a road, caught a ride with the first vehicle contacted and completely left the area. Establish road blocks and patrols on all roads leading into and out of the confinement perimeter. In the case of wilderness areas, both trail blocks, patrols, and camp-ins (in a specified drainage) will serve to identify and preserve perimeter boundaries.



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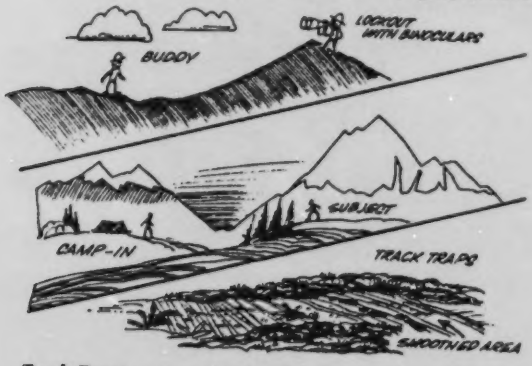
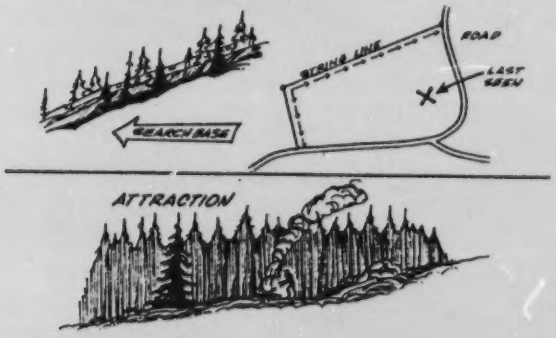
Look-outs — Where existing National Forest and Park Service look-out stations exist, notify these sites of the missing subject and ask for observation assistance. In many cases look-outs have been replaced with aircraft overflights. Specific posting of individuals in strategic locations on high ground is also a viable method of establishing a perimeter.



Track Traps — A method used for many years by the U.S. Border Patrol is the placing of track traps. This involves brushing off bare areas, dragging road edges, or lightly traveled back roads. The intent is to frequently check for footprints in the brushed areas for an indication that the subject has moved through the perimeter.



String Lines — An ingenious method of confinement has also been developed by the Explorer Search and Rescue (ESAR) Organization. Spools of string are mounted in a backpack. As the search team member carrying the pack walks through an area, the string unrolls leaving a very visible trail. Other ESAR members following along tie the string waist high on brush, etc. and place paper arrows on the string pointing toward a road or base camp. It is assumed that the subject will follow the arrows, or at the very least, the string will serve as a visible perimeter.

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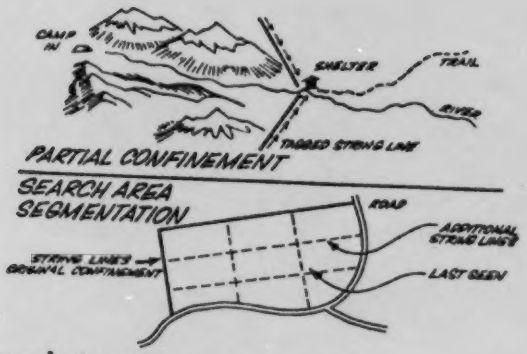
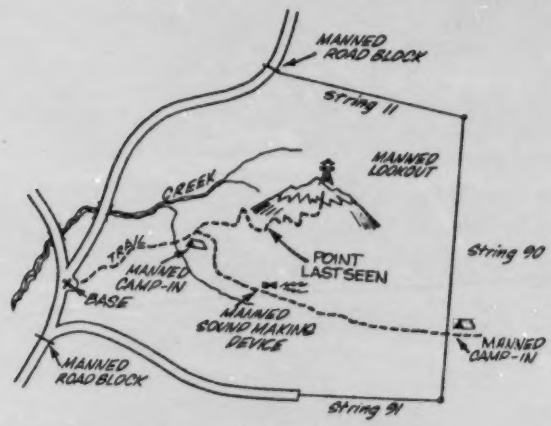


Search Area Segmentation

Now that you have narrowed the probable area to something more manageable, it may still be necessary to further subdivide into smaller sections. The purpose of search area segmentation into sub-areas is crucial for maintaining control and assuring search coverage.



1. The search manager should be aware that effective area segmentation is contingent upon many factors, and consideration must be given to these points.
   a. Specific SAR resources excell in definite terrain types. Pick areas tailored to resource capabilities.
   b. If natural barriers exist for the subject, by inhibiting movement, then they also can be used by searchers to identify boundaries and for orientation. Boundaries must be readily identifiable.
   c. Size of the area has an impact on the performance of the searchers. Is it too large for coverage in a reasonable length of time? It is important for searchers to realize progress in their effort. Also, time frames in the field should be geared to meals and breaks. If assigned areas are tailored to these, a much smoother operation will result.

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d. The type of search tactic or formation being used also would have an impact on the search managers subdividing of the probable area. Initially, in a Type I* search, very loosely defined sub-areas may suffice. Independent efforts in these sections are primarily aimed at turning up clues, live subject contact, attraction or confinement (use of Binary Search Theory). If clues are found and eyewitness accounts recorded, or if historical data and terrain analysis point out more likely areas, a Type II search may be initiated. Now more definitive boundaries and specific subdivisions must be established. As the manager makes the decision to progress into a Type III search, very specific subdivisions must now be made and identified. The use of string lines (ESAR), ribbons, and other specific boundary markers must be employed.

*Further information on Type I, Type II, and Type III search procedures begins on page 50.

Clue Orientation

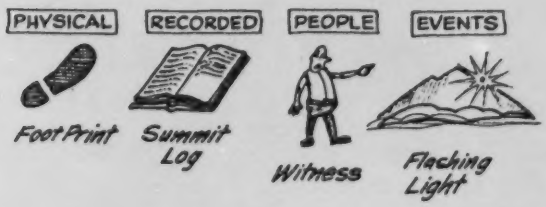
Clue Seeking: Not only the searching for a subject, but the larger problem of defining characteristics and behavior (clues).

General Principles of Clue Seeking

1. Clue seeking is an on-going process that starts with preplanning, continues through a mission and doesn't end until the critique is over.
2. Good clue seeking is a learned skill, and must be practiced to develop a sense of what is minimum information to work with.
3. Avoid forming opinions and then gathering information to support that opinion.
4. Don't immediately form an opinion about the value of a clue.
5. Gather information from everyone, as no one person can adequately gather all the facts.
6. Assemble a complete profile of the missing subject and the situation and let it offer direction.

Search for clues, not subjects—there are always more clues!

1. **Physical** — foot prints, cigarette wrappers, etc.
2. **Recorded** — trail register, summit logs, trip plan.
3. **People** — eyewitness, point last seen, friends, family.
4. **Event** — a light, a campfire, a signal.



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The search area must contain all the clues

1. The search area must include non-contiguous areas, (ie. subject's home, friend's home, a car, local bar, etc.)
2. Back track subject to where his/her activities are no longer pertinent.

Detection resources

1. Clue Finders — dogs, trackers, hasty teams, aircraft.
2. Clue/Subject Finders — hasty teams.
3. Subject Finders — grid searchers.

Remember:
As the search progresses, detection resources go from independent to extremely dependent in their activities.
PLAN FOR THIS!

Accurate and sequential log of clues found is important

1. Helps reconstruct the scenario that led to the subject getting lost.
2. Assign someone to do nothing more than construct an accurate time sequence.

Use sign cutting as a more efficient and time saving action

1. Make sure that sign cutters are skilled.
2. Realize that sign cutting has limitations on its reliability.
3. Sign cutting (binary search) is an effective, efficient method to detect clues.
   a. The easiest way to find someone is to know where they aren't.
   b. Selective sampling of clues is better than looking at every one.
   c. The search area circumference is more easily searched than the area itself.

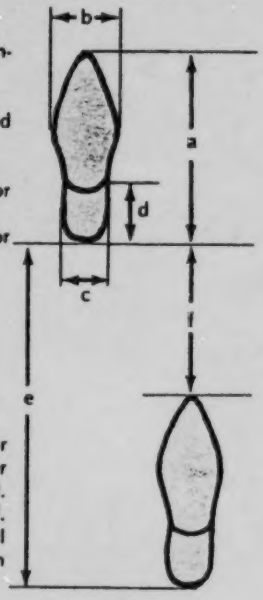
Guidelines for gathering clue information

1. Establish a category of subject and detectability
   a. Child (by age group)
   b. Hiker
   c. Hunter
   d. Berry picker
   e. Fisherman
   f. Despondant
   g. Elderly senior citizen
   h. Climber
   i. Mentally retarded
   j. Others
2. Determine if there is any statistical data about the subject category (this information can provide a start).
3. Establish an exact point last seen or a last known position.
   a. Provides a point to begin looking for physical clues
   b. Go to the spot and study it
   c. Important in considering distances traveled
4. Circumstances of loss.
   a. Known location
   b. En-route
   c. Wilderness or inaccessible location
5. The subject.
   a. Physical condition and health
   b. Personality
   c. Equipment
   d. Effects of terrain on movement

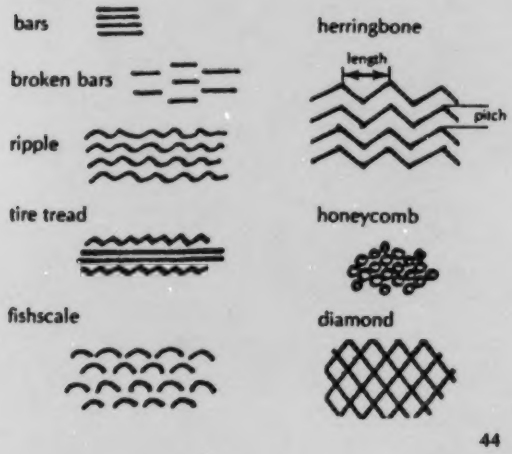
Track Identification

When you find a track during a perimeter cut or a hasty search, you should draw a detailed sketch. You may have to describe the track to base or to another tracking team over the radio. If so, you should describe the track in such a way that anyone listening can draw the same sketch as you have drawn. The following scheme represents our current thinking about how a track can best be described over the radio.

1. **Right or left**
   Are right and left tracks mirror images?
2. **Basic type**
   Flat (no heel) or distinct heel and toe?
3. **Shape**
   a. Toe: pointed, rounded, box or square shaped
   b. Heel: leading edge straight or curved
   c. Instep: high or low
4. **Size**
   a = overall length
   b = sole width
   c = heel width
   d = heel length (if any)
   e = stride (heel-to-heel)
   NOTE: When working with other teams, be sure to state whether stride is heel-to-heel or toe-to-heel. Stride (toe-to-heel) = e - a = f. We use heel-to-heel since heel prints are usually easier to see than toe prints.



5. **Sole Pattern**
   a. Border, nails or stitching, labels, trademarks, numbers.
   b. Pattern type: Plain (no pattern), regular, irregular, or mixed.
   Regular:



Irregular: circles — concentric, suction cup, semicircles or arcs;
bars — straight or curved, longitudinal (lengthwise, vertical), transverse (crosswise, horizontal), diagonal
chevrons
diamonds
lugs or stars

Mixed: regular and irregular

NOTE: A fine pattern may appear to be plain if the ground surface is too coarse. Be sure to state number, size and location of irregular pattern features.

6. **Heel Pattern** (if distinct)
   Pattern, nail holes, slanting or rounding edges.
   NOTE: Nailed heels will generally have either 8 holes (3 across leading edge) or 13 holes (4 across leading edge).
7. **Unique Features**
   Cuts, worn spots, heel plates; anything that makes this print different from others like it.
8. **Gait**
   Toes in or toes out; deep toe or heel dig; possible limp.

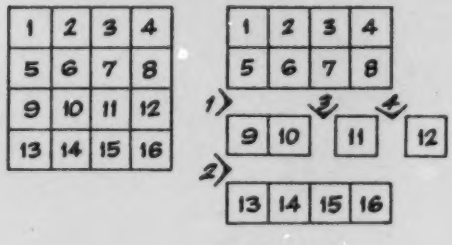
The following types of tracks occur often enough that we have named them. As long as everyone uses these names to mean the same thing, much time can be saved in describing a track.

Sneaker: Molded heel and toe, usually plain (because fine pattern doesn't show), or else fine regular pattern without any border. Subtypes: deck shoe, tennis shoe.

Gym shoe: Flat (no heel); coarse pattern, usually irregular geometric shapes with definite border.

Lug boot: Separate heel and toe; coarse lug and star pattern. Subtypes: Montagna Vibram, Security Vibram, Klettershuh.

BY ELIMINATION, VAST PORTIONS OF SEARCH AREA CAN BE NEARLY IGNORED.



TRACKING WORKSHEET

Location: _____

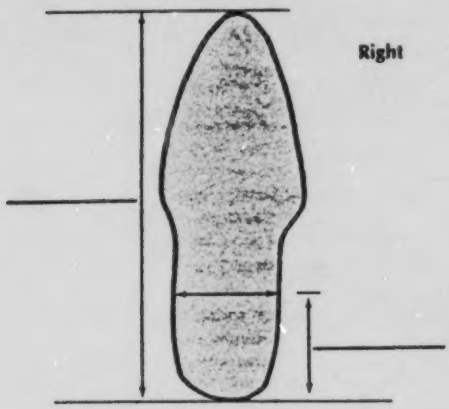
Remarks: _____

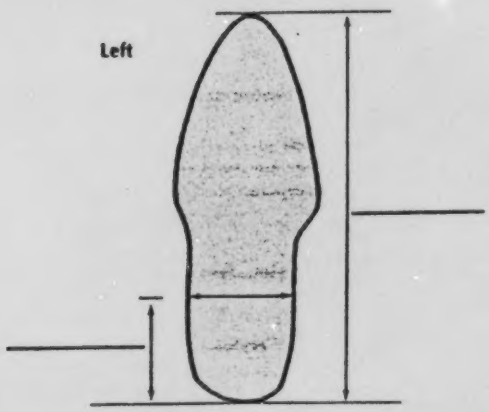
_____

_____

Stride: _____

Heel to heel/Toe to heel (Circle one)





Assigned identification _____

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Applying SAR Resources

Search is an emergency

1. The condition of the subject is unknown (medical care may be imperative).
2. Time and weather destroy clues.
3. Urgent response decreases size of the probable search area.
4. The subject may progressively be getting into worse conditions.

Search at night—Don't wait until morning!

1. The subject is most likely stationary.
2. Night is ideal for tracking.
3. Confinement is possible.

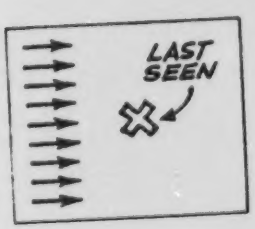
PERIMETER CUT	vs.	HASTY SEARCH
• *Search primarily for tracks.*		• *Search primarily for subject.*
• *Cut at right angles to route of travel.*		• *Follow route of travel.*
• *Weave around to pick best tracking ground.*		• *Take path of least resistance.*
• *Make continuous cut around an area.*		• *Check specific locations or routes.*
• *Concentrate on ground at your feet.*		• *Look all around.*

USE ATTRACTION!

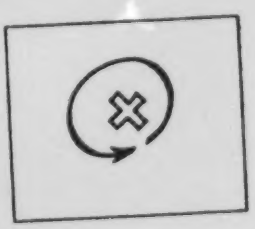
Initial attack—The first offensive move!

1. Move quickly into high probability areas and look for clues.
2. Know your resources and their capabilities.
3. Initial resources are clue conscious/trained
   - trackers
   - dogs — air scenting and tracking
   - hasty teams
   - aircraft etc.

SIGN CUTTING IS IN, OTHERS ARE OUT:



GRID



SIGN CUTTING

Initial tactics

1. Binary search (perimeter cutting)
2. Hasty search
3. Confinement
4. Attraction

Two basic philosophies—The best strategy combines both!

1. **Passive** (the subject comes to you): wait, confinement, attraction.
2. **Active** (you find the subject): hasty teams, trackers, dog teams, air search.

Establishing priority

1. What is the relative urgency?
2. The more urgent the situation, usually the more active the strategy.

Factors to consider in applying SAR resources

1. Consider all resources available.
2. Level of training?
3. What can the resource provide in relation to what is needed?
4. Can the resource give an effective evaluation of their performance.

Resource identification

1. The search manager must know the capabilities and SOP's of all resources used.
2. The preplan should identify key information on each resource.
3. As a minimum, each team should have optimum skills and equipment listed.

General principles of applying SAR resources

1. Know the resource and level of training.
2. Be familiar with outside or back up resources and how to procure them.
3. Include all resources in a preplan.
4. Match resources to capabilities.
5. Initial attack resources should require minimum direction and control.
6. Pick resources that are diverse in their skills.
7. Plan to progress from independent functions to search manager dependent functions as the search progresses.
8. Make sure all resources have adequate communications.

Key points in organization of SAR resources

1. Team efforts are usually always more productive than individual efforts.
2. Use the chain of command when dealing with organizations.
3. Make sure every resource has well defined responsible tasks to perform.
4. Never mismatch capabilities with an assigned function.

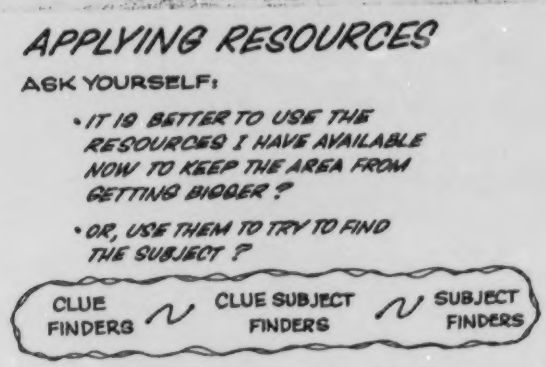
Callout Procedures

Information to provide to resources when you call:

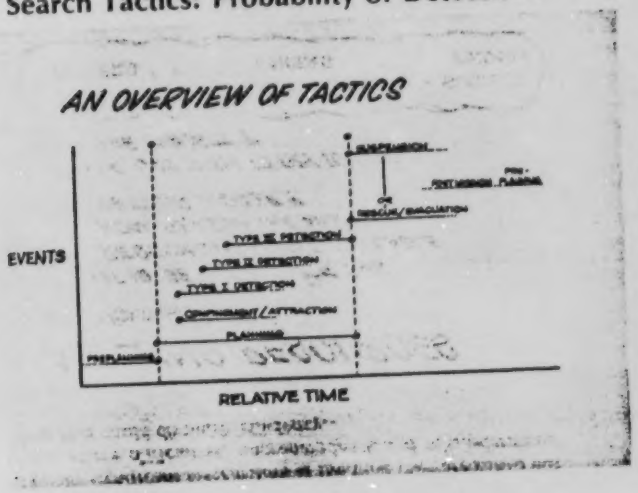
When requesting assistance from outside resources, you must provide them with certain information. Information may vary with the specialty of each resource, but generally will include:

1. Description of the situation (who, what, when, where, how).
2. Special skills needed from them.
3. Who (what other units) are responding.
4. Number of persons (and/or teams) required. Request that they call you back and confirm numbers actually responding before they depart.
5. Current weather and forecast at the search area.
   a. Road conditions
   b. Flying conditions
6. Terrain description.
7. Elevation range.
8. Personal equipment needed by searchers.
9. Group or specialized equipment needed.
10. Communications procedures; frequencies, etc.
11. Map quads being used.
12. Meeting place.
    a. Signs
    b. Markers
    c. Route suggested
13. Who to report to upon arrival at the search area.
14. Callback number.
15. Call off procedures (in case subject is found while they are enroute).
    a. License numbers, vehicle descriptions
    b. Check-in periodically while enroute
    c. Public radio
    d. Their own communication system

Providing the alerted resources with organized and operationally significant information at the time they are called out will reduce difficulties, unpreparedness and misunderstandings that could diminish efficiency.


APPLYING RESOURCES
ASK YOURSELF:
• IT IS BETTER TO USE THE RESOURCES I HAVE AVAILABLE NOW TO KEEP THE AREA FROM GETTING BIGGER ?
• OR, USE THEM TO TRY TO FIND THE SUBJECT ?
CLUE FINDERS
CLUE SUBJECT FINDERS
SUBJECT FINDERS

Search Tactics: Probability of Detection



Attraction Methods

Efforts taken to cause the subject to be attracted to and travel to a desired location.

1. Noise (sirens, whistles, yelling, PA systems, horns.)
2. Lights (beacons, flares, fires, strobe lights, search lights, patrol car lights.)
3. Smoke
4. Aircraft
5. Balloons

Detection Methods

Efforts to actively search for the subject or clues.

1. **Type I** — Rapid response to areas of high probability by immediately available resources.

TYPE I - Criterion is Speed!

a. **Type I Considerations**

- The assumption is (depending on elapsed time between when subject went missing and when reported) that you are looking for a *responsive* subject.
- It provides an immediate show of effort.
- It can help define the search area by gathering intelligence or locating clues, or in follow-up after a clue is located.
- Clue-consciousness is critical.
- It often results in determining where *not* to search further.
- Preplanning is crucial for the availability and effective use of Type I resources.

b. **Type I Techniques**
   - Thorough checks of last known position (for clues, tracks, direction of travel, etc.)
   - Follow known or suspected route.
   - Trail running.
   - Perimeter check (may be in conjunction with confinement).
   - Sign cutting.
   - Road patrols.
   - Check attractions.
   - Check hazardous areas.
   - Check drainages.
   - Ridge running.
   - Bastard search.
   - Locating any clues.

c. **Type I Most Effective Resources**
   - Trained (clue conscious) hasty teams.
   - Human trackers (for both tracking and sign cutting).
   - Dogs, particularly air scent dogs.
   - Aircraft.
   - Other, very mobile, *trained* resources.

2. **Type II** — A fast, systematic search of a high probability segment of the search area using techniques that produce high probabilities of detection per searcher-hour of effort.

TYPE II - Criterion is Efficiency!

a. **Type II Considerations**
   - Often employed after Type I efforts in some segments, especially if Type I tactics found clues.
   - In other search segments, particularly heavily vegetated ones, may be the initial search effort tactic used.
   - Should be used when subject *responsiveness* is assumed to be still high.
   - Type II efforts are often effective in locating clues.

b. **Type II Techniques**
   - Used in a specific area or segment of the search area.
   - Follow-up in an area where a clue has been found.
   - Open grid, with wide spacing between searchers.
   - Search routes are followed with compass bearings.

c. **Type II Most Effective Resources**
   - Clue conscious teams.
   - Dogs.
   - Trackers, sign cutters.
   - Aircraft.
   - Trained grid teams.
   - Other *trained* teams.

3. **Type III** — A slower, highly systematic search, using thorough techniques.

TYPE III - Criterion is Thoroughness!

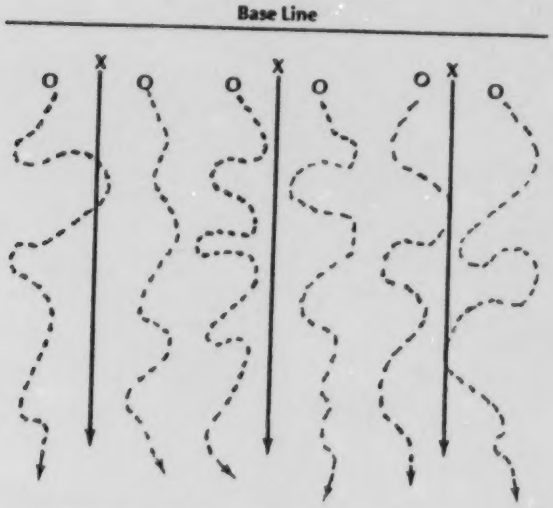
a. **Type III Considerations**
   - Should be used only as a last resort.
   - Usually, Type III searches are extremely destructive to clues, because persons used are not clue conscious.

b. **Type III Techniques**
   - Closed grid or sweep search.

c. **Type III Most Effective Resources**
   - Trained grid search teams.

A Useful Type II Technique

A three (3) person team, using one compass-bearer. Teams work independently from other teams.



X = Compass-bearer — basically a non-searcher who follows the designated bearing.

O = Searchers — free to wander, checking likely spots, continually "guiding" on the compass-bearer.

This technique can be used in open grids with a number of independent teams equally spaced, or the teams can work independently in any of a number of other search patterns.

Probability of Detection Calculations

POD = The probability that the subject or clue will be detected under given conditions if it is in the search area.

How to establish POD values

1. Past research
2. Ask the resources involved:
   "If there had been 10 subjects (clues) in the area how many would you have detected?"
3. Consider effectiveness:
   a. Extent resources stayed in their designated search area.
   b. Environmental factors (weather, terrain, vegetation).
   c. Searcher factors (experience, fatigue, leadership).
   d. Time allowed (speed area was covered).
   e. Other related factors.

Search Effectiveness Factors

This provides a standard procedure for estimating aircrew search effectiveness. The debriefing officer will apply a value to each factor listed, as in the example. The sum of the values equals estimated effectiveness. The same approach can be used to evaluate effectiveness of other resources. The optimum value is 10, decreasing to 0 for no value.

1. Ability to maintain optimum altitude and airspeed.	
2. Favorable meteorological visibility and weather conditions.	
3. Nature of terrain.	
4. Optimum track spacing and track spacing flown.	
5. Qualification and availability of scanners.	
6. Accuracy of navigation (consider aids used and available).	
7. Enough time in search area to allow thorough search.	
8. Attitude and physical condition of search crew after flight.	
9. Adequate crew rest before flight.	
10. Quality of lunches, coffee, water, etc.	
TOTAL:	

NOTE: The estimated effectiveness total does not equate to the POD, but is used to verify or assist in determining the POD.

The "Standard" Data (Grid Searching)

To search one square mile:

Spacing	Hours	Searchers	Searcher-Hours	POD
100'	3.5	53	185.5	50%
60'	3.5	88	308.0	70%
20'	3.5	264	924.0	90%

Given: 1. Trained grid searchers
2. Moderate to dense underbrush
3. Daytime

To calculate POD for other spacing

POD% = 100 - (0.5 x spacing)

Example with 40' spacing:

POD% = 100 - (0.5 x 40)
= 100 - 20
= 80%

To calculate POD for multiple coverage

1 - (POD% of 1st Coverage) = a
1 - (POD% of 2nd Coverage) = b
1 - (POD% of 3rd Coverage) = c
Cumulative POD% = 1 - (a x b x c)

Example: 1st Coverage POD = 20%
a = 1 - .20
= .80
2nd Coverage POD = 50%
b = 1 - .50
= .50
3rd Coverage POD = 25%
c = 1 - .25
= .75
Cumulative POD after 3rd Coverage:
POD = 1 - (a x b x c)
= 1 - (.80 x .50 x .75)
= 1 - (.30)
= .70 or 70%

TO INCREASE PROBABILITY THAT SUBJECT IS IN SMALLER AREA, IT IS IMPORTANT TO:

1. *Respond quickly*
2. *Confine subject's movements*
3. *Find clues*

Grid Searchers
To search one square mile:

P_d (%)	Spacing (feet)	Searchers	Hours*	Total Searcher Hours
5	190	27.8	3.5	97.2
10	180	29.3	3.5	102.7
15	170	30.1	3.5	108.7
20	160	33	3.5	115.5
25	150	35.2	3.5	123.2
30	140	37.7	3.5	132
35	130	40.6	3.5	142.2
40	120	44	3.5	154
45	110	48	3.5	168
50	100	53	3.5	185.5
55	90	58.7	3.5	205.3
60	80	66	3.5	231
65	70	75.4	3.5	264
70	60	88	3.5	308
75	50	105.6	3.5	369.6
80	40	132	3.5	462
85	30	176	3.5	616
90	20	264	3.5	924
95	10	528	3.5	1848
100				

*Average trained grid team takes 3.5 hours to go 1 mile.

Search Manager should be able to -

- *ESTABLISH OBJECTIVES*
- *ESTABLISH PRIORITIES*
- *EVALUATE RESOURCES*
- *DEVELOP PLAN OF ATTACK*
- *DELEGATE RESPONSIBILITIES*
- *DEVELOP RESOURCES*
- *COORDINATE EFFORTS*
- *EVALUATE RESULTS*
- *DEVELOP NEW PLANS*

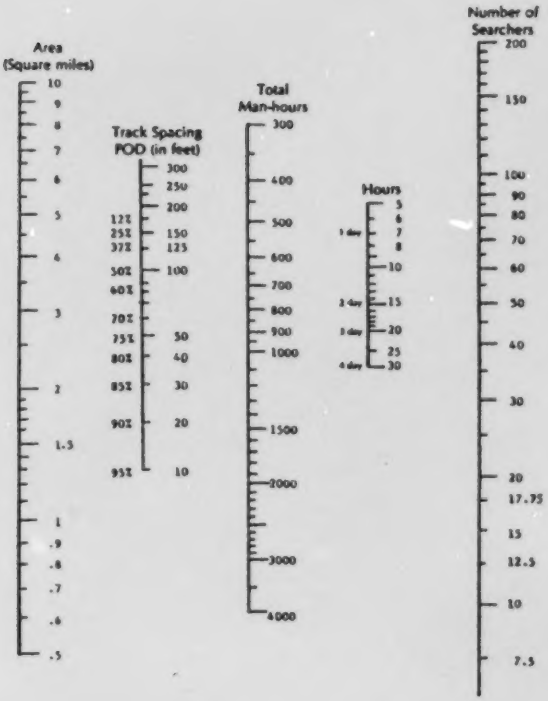
CUMULATIVE PROBABILITY OF DETECTION (POD) CHART

Previous Cumulative (POD)	5-10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	80+
5-10%	15								
11-20%	20	25							
21-30%	30	35	45						
31-40%	40	45	50	60					
41-50%	50	55	60	65	70				
51-60%	60	65	65	70	75	80			
61-70%	70	70	75	80	80	85	90		
70-80%	80	80	80	85	85	90	90	95	
80+	85	85	90	90	90	95	95	95	95+

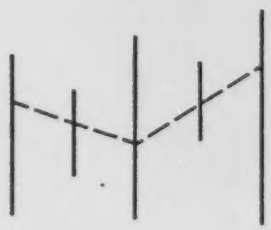
1. Find the previous cumulative POD on the left
2. Find the POD for this search on the bottom
3. Locate the box where the row and column meet

Example: 1. Previous cumulative POD = 45%
2. POD this search = 15%
3. New cumulative POD = 55%

RELATED VALUES



Related values form
two straight lines



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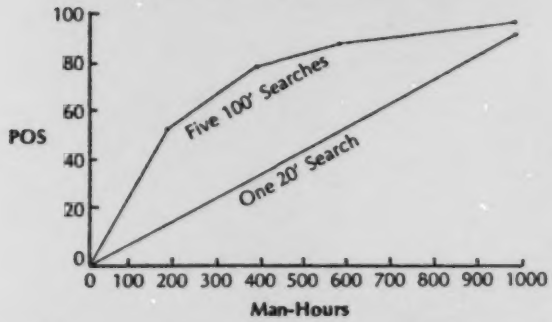
Repeated sweeps of the same area with wide spacing will yield better results than a single sweep with close spacing.

It is mathematically possible to determine the probability of success (POS) where the same area is searched two or more times. Where the 20′ spacing is compared to the 100′ grid, the results are graphed as follows:

Man-hours vs. POS for multiple 100′ sweeps compared to a single 20′ search. (Assume it requires 1,000 man-hours to search the area once with a 20′ spacing.)



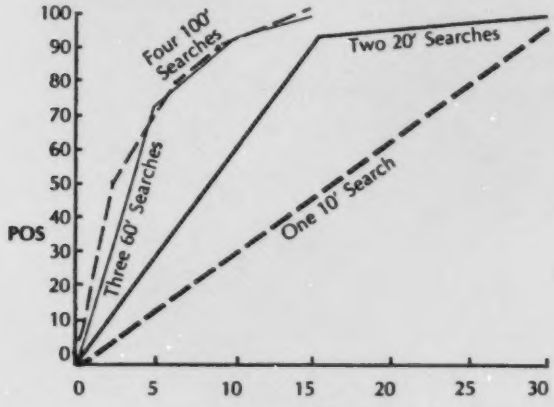
At 200 man-hours into the effort, the 1st 100′ search will be finished (POS = 53%): the 20′ grid will be only 1/5 of the way done (POS = 18.4%). At 400 man-hours, the 100′ search will be up to a POS of 78% while the 20′ grid will be at 36.8%. Even at the end of the 20′ grid (1000 man-hours), the 100′ searches will have a POS of 97.71% compared to 92% for the 20′ grid. At every point, multiple sweeps using wide spacing produce superior results to a single grid with close spacing.

REPEATED SWEEPS WITH WIDE SPACING VS. A SINGLE SWEEP WITH CLOSE SPACING!

- There is a tendency for team members to feel uncomfortable with wide spacing. They want to do a good job, but they also know they aren't being thorough.
- Two ways to reduce this conflict:
  1. Educate team members about the concepts of non-thorough searching methods.
  2. The responsibility for missing the subject is the search director's, NOT the team members.

This method of searching is a good gamble; IT WILL PAY OFF MORE TIMES THAN NOT.

Probability of success as a function of time.
(Hypothetical problem assumes there is sufficient manpower to search the whole area in 30 hours with a 10′ spacing.)



This figure illustrates that you will produce a higher probability of success in less time with wide spacing (60′ and 100′) as compared with much closer spacing (10′ and 20′). For example, at only 6 hours into the 30 hour search (above), the POS values are:

Spacing	POS
10′	19%
20′	37%
60′	75%
100′	78%

This is quite a difference—a difference that is determined totally by a different application of the *same* manpower.

To put this observation into context, the POD data used in making this figure was based upon actual measurements taken in a fairly dense area of brush and trees. The average *search director*, given no exposure to the concepts described here and relying only on his judgement and intuition, *would probably choose a 10′ to 20′ spacing* for a sweep search of that area. That would be the usual and comfortable approach which is still in common use. In light of these newer concepts, however, the old comfortable ways appear wasteful.

Old Wives' Tales

- ***An area should be searched only once. It's wasteful to search it a second time.***
- ***You should search in such a manner that "you can be sure the lost person is not in the area." The emphasis is upon thoroughness (close spacing).***
- ***It is better to get large numbers of grid searchers into the area quickly.***

Techniques Information

1. Rotate teams from area to area rather than have same team re-search same area.
2. Mark search areas well.
3. Don't worry about staggering spacing between the first and second search.
4. On second, subsequent searches, start from different angle if practical.
5. Use 3-man team concept for very wide spacing.
6. Teach concepts to team members and leaders. Or, they will be uncomfortable with this strategy.

When non-thorough methods should be used

1. Whenever there is a large search area in relation to the manpower available.
2. Whenever time is a factor.
3. For evidence searches where numerous objects are being sought.
4. When substantial manpower is expected, but hasn't arrived yet.

Effect of Multiple Sweeps

Spacing	Sweep 1	Sweep 2	Sweep 3	Sweep 4	Sweep 5
100'	50%	75%	87.5%	93.75%	96.875%
60'	70%	91%	97.3%	99.2 %	99.8 %
20'	90%	99%	99.9%	99.99%	99.999%

When thorough methods should be used

1. If there is abundant manpower.
2. Where circumstances make wide spacing impractical.
   a. Dangerous terrain
   b. Some kinds of heterogeneous terrain
   c. Logistical difficulties
   d. Search director mandates it

Efficient Distribution of Resources

Various resources and methods have different probabilities of detection. There are also various probabilities of a subject being any given distance from the point last seen. Multiplying the probability of detection (POD) times the probability of a subject being in a given location (POA), predicts the probability of a successful find (POS).

POD X POA = POS

The probability of success (POS) can be used to compare one resources distribution against another. For example:

Given: 1. Helicopter—POD is 40% and takes 2 hours to search one square mile.

2. Searching dogs—POD is 80% and takes 4 hours to search one square mile.

3. Grid search— 20′ spacing POD is 90%
   60′ spacing POD is 70%
   100′ spacing POD is 50%
   } with a travel rate of 3.5 hours per mile

Estimations of a POA distribution for three different areas:

1. PLS (Point Last Seen) up to 1 mile, the POA is 36%; search area is 3.14 square miles.
2. Between 1 and 2 miles, POA is 50%; search area is 9.42 square miles.
3. Between 2 and 3 miles, POA is 7%; search area is 15.7 square miles.

The POS and searcher hours can be calculated for different combinations in each area to decide which combination is the most efficient in terms of time and holds the greatest probability of success.

	Area A	Area B	Area C	Searcher Hours	POS
1.	Dogs	20′ grid	helicopter	8748.04	76.6%
2.	20′ grid	Dogs	helicopter	2970.44	75.2%
3.	Dogs	60′ grid	helicopter	2945.32	66.6%
4.	Dogs	helicopter	100′ grid	2943.82	52.3%
5.	60′ grid	helicopter	dogs	1048.74	50.8%

Note that distribution #1, with the highest POS of 76.6%, takes a large amount of time or people to accomplish. While #3 and #4 differ by only 1.5 searcher hours, however, there is a 14.3% difference in POS.

A search director may not find it feasible to pursue the highest probability of success due to time or the number of grid searchers available. Therefore, he might elect #2 with #3 as an alternative.

Determining Area Size for Grid Searching

In order to determine the optimum size of area to be searched, it is first necessary to establish a reference point for planning. It can be any one of the following:

a. Point Last Seen (PLS)
b. A Predicted Position (PP)
c. An Estimated Position (EP)

(Separate POA tables are available for each reference.)

The number of grid searchers available to any search director will vary for any given search and will further vary from day to day on that particular search mission. To calculate the optimum size area, it is only necessary to know the number of searchers available for that day, and select the reference point. Varying the spacing between searchers determines the POD, then multiplying this POD by the appropriate POA produces the probability of success. The spacing that produces the highest POS is considered the optimum size of area to search with that number of searchers.

To demonstrate the principle, start by placing searchers very close together (high POD) and increase the spacing by steps of 10. Then select a small area to search (low POA), and increase the size of area in steps based on the number of searchers available.

The following table demonstrates a search for a lost hiker in the mountains, with 75 grid searchers. The table displays calculations for "Point Last Seen" and "Predicted Position" planning.

Base			PLS		PP	
Line	Spacing	POD	POA	POS	POA	POS
.2	14.08	.9096	.0116	.0105	.1034	.0940
.4	28.16	.8592	.0232	.0199	.1379	.1184
.6	42.24	.7888	.0348	.0274	.1551	.1223
.8	56.32	.7184	.0863	.0619	.1724	.1238
1.0	70.40	.6480	.1379	.0893	.2413	.1563
1.2	84.48	.5776	.2068	.1194	.3793	.2190
1.4	98.56	.5072	.2240	.1136	.3946	.2001
1.6	112.64	.4368	.2413	.1053	.4099	.1790
1.8	126.72	.3664	.2585	.0947	.4252	.1557

This table shows that the best spacing is 85 feet between the searchers (forming a base line of 1.2 miles), both the PLS as well as the PP reference points. However, the probability of success is quite different. Planning this search from the PLS has a predicted success of 12%, while searching from the PP has a predicted success of 22%, a 10% gain.

Search directors should use such tables to determine the area size, and the reference point that yields the highest probability of success.

Adjusting Probabilities

At the beginning of a search there are specific areas with a higher probability of containing the subject. As each area is searched with negative results, the probability of the subject being in another area increases. For example, if we have four areas, and there is an equal probability that the subject might be in any one of them, then we have a distribution of:

Area A	Area B	Area C	Area D
25%	25%	25%	25%

If we search area A, with 100% coverage, then area B, and then area C, the probability of the victim being in area D is as follows:

Area A	Area B	Area C	Area D
25%	25%	25%	25%
—	33.3%	33.3%	33.3%
—	—	50%	50%
—	—	—	100%

In search work, 100% coverage is seldom possible due to time or resource limitations. A coverage with less than 100%, and a negative answer when one specific area has been searched, results in one of two alternatives:

a. The subject was *missed* by the searchers.
b. The subject was *not* in the area.

By considering the probability of a.) missing the subject, then the likelihood of b.) can be calculated. This can be done using the following formula:

$$POA = \frac{Pa \times Pm}{(Pa \times Pm) + Pn}$$

Pa is the original probability
Pm is the probability of the subject being missed
Pn is the probability that the subject was not there in the first place

Using the above example, and searching area A with a 70% coverage, the probability of the subject being in area A is:

$$POA = \frac{.25 \times .3}{(.25 \times .3) + .75} \text{ equals } \frac{.075}{.825} \text{ equals .09 or 9\%}$$

There is now a 9% chance that the subject is still in area A.

After area A has been searched, then the probabilities of the subject being in areas B, C, and D are as follows:

	Area A:	Area B:	Area C:	Area D:
Original:	25%	25%	25%	25%
	9%	30.3%	30.3%	30.3%
	11.5%	11.5%	38.45%	38.45%
	15.8%	15.8%	15.8%	52.6%

When area C has been completed, then there is a 52.6% chance that the subject is in area D, and only a 15.8% chance that the subject is still located in areas A, B, or C.

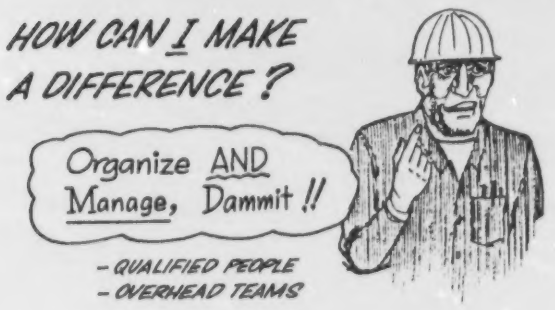
In the original example, the probability of the subject being in any of the areas was equal (25%), and each area was searched with equal coverage (70%). Seldom does this occur on real searches as areas usually have *unequal* POA's, and are searched with unequal POD's. For calculations under these conditions, the following formula is used:

$$POA = \frac{Pa \times Pm}{K\,[(Pa \times Pm) + Pn]}$$

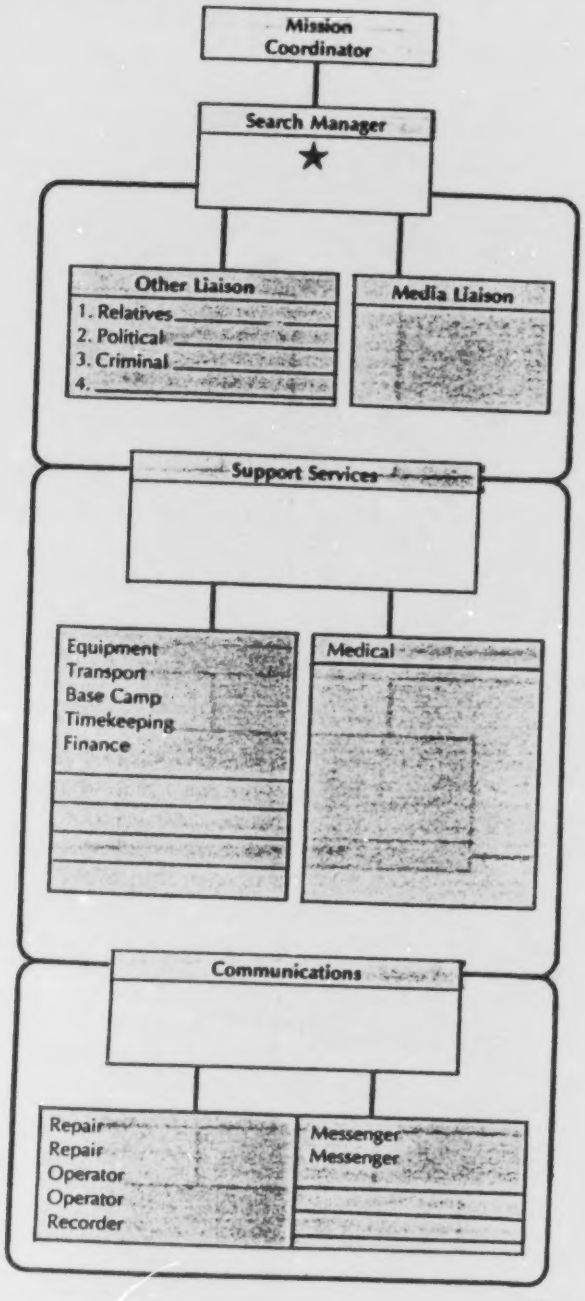
Pa is the probability of being in the area.
Pm is the probability of being missed.
Pn is the probability of not being there.
K is the (Pa x Pm) + Pn of the previous area searched.

Values That Must Be Assigned

1. ***A value that gives a priority to the mission urgency***
2. ***A value that gives priorities to search areas..... Pa***
3. ***Values to ability of resources to detect subject..... Pd***
4. ***A value that is the product of Pa x Pd to measure success..... Ps***



Organization: The Overhead Team



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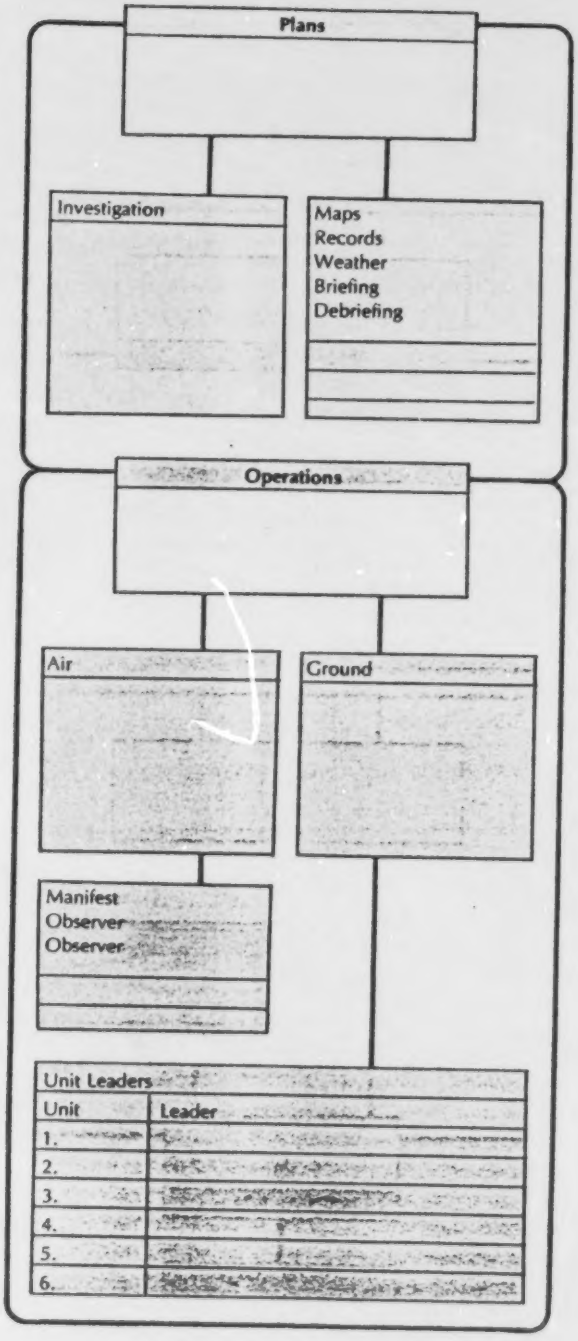
Plans
Investigation
Maps
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Weather
Briefing
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Unit Leaders
Unit
Leader
1.
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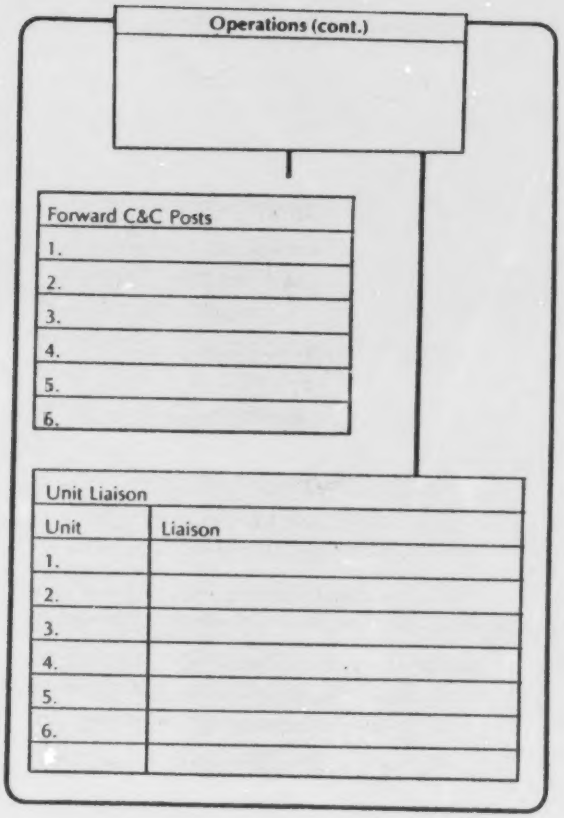

Operations (cont.)
Forward C&C Posts
1.
2.
3.
4.
5.
6.
Unit Liaison
Unit
Liaison
1.
2.
3.
4.
5.
6.

Definitions and description of command titles used in the Overhead Team block diagram.

Mission Coordinator

Person with overall responsibility for the prosecution of the mission. Usually a government official such as the county sheriff or one of the Military Rescue Coordination Centers.

Search Manager

Person at the scene of the incident who is in control of or coordinates the activities of all units involved in the effort. Usually the person with the most SAR experience in the area.

Investigation

Those charged to investigate, interview and interrogate in order to obtain the necessary information to develop the true situation.

Plans

Person in charge of strategy and tactics. He evaluates information and clues and decides upon the best resources and methods for their employment suitable to the particular mission.

Support Services

Person in charge of the housekeeping functions related to any operation. He is responsible for feeding, housing, procuring and transporting the units involved, as well as the managing of the medical and financial matters.

Ground Operations

Responsible for the briefing and operations of all ground units. Maintains a current map of all search operations. Responsible for the proper discharge of all field assignments and safe return of units upon completion of those assignments.

Air Operations

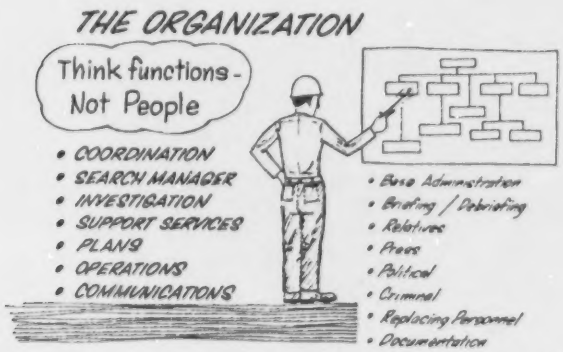
Responsible for coordinating all activities concerning aircraft (including helos) by establishing contact with the operations personnel of units assigned to participate in the effort. Also responsible for arranging for fuel and maintenance.

Communications

Responsible for establishing an effective communications network, radio repair, maintenance and logkeeping.

Unit Leader

Person in charge of a particular SAR unit or resource on the mission. He acts as liaison for his unit and responds to the direction of the search manager and his staff.



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Overhead Team Responsibility Checklists

Search Manager

Moves himself and aides to scene of operations.

1. **Initial phase**
   a. Gather information and evaluate.
   b. Assume command and assign permanent staff.
   c. Assign information units as necessary.
   d. Delegate authority as necessary.
   e. Establish true picture.
   f. Initiate primary search effort.
2. **Operations**
   a. Develop search strategy with staff and brief staff.
   b. Insure adequate SAR forces, material, and resources.
   c. Establish and maintain control of search organization, resources, and operations.
   d. Confer with the Mission Coordinator and provide full information.
3. **Coordination**
   a. Provide leadership.
   b. Be available to staff and maintain high morale and confidence.
   c. Debrief and consult with staff.
   d. Hold joint strategy conferences and brief staff.
   e. Brief replacement.

Plans

Establish strategy and tactics for mission.

1. **Initial Phase**
   a. Assist Search Manager as requested.
   b. Develop initial attack.
   c. Assist in obtaining SAR resources for mission.
2. **Operations**
   a. Develop search strategy and tactics.
   b. Confer with Search Manager and investigation unit.
   c. Debrief returning units immediately.
   d. Confer with Ground and Air Operations Officers.
   e. Check up-dated search maps and information.
   f. Keep search strategy and tactics planning 24 hours ahead of day's operations.
   g. Re-adjust preplan for morning briefing as needed.
3. **Logistics**
   a. Obtain all maps for command, field and air operations in quantity as strategy necessitates.
   b. Obtain weather information at time of incident; maintain information on short and long-term weather forecasts.
4. **Coordination**
   a. Confer and consult with all staff.
   b. Attend all conferences.
   c. Brief replacement.

Investigation Unit
Establish true picture of incident and subject.

1. **Initial phase**
   a. Gather all information.
   b. Assist Search Manager and Plans Officer in evaluating all information.
2. **Operations**
   a. Maintain on-going investigation.
   b. Request additional information resources as necessary (i.e., in town, state motor vehicles, etc.).
   c. Assist in strategy planning.
3. **Coordination**
   a. Fully brief Search Manager and Plans Officer.
   b. Attend all conferences.
   c. Brief replacement.

Ground Operations Officer
Get briefed by Search Manager or Plans Officer.

1. **Initial phase**
   a. Set up map.
   b. Assist in developing search strategy and get briefed.
   c. Request resources as necessary.
2. **Operations**
   a. Brief and assign teams, implement search strategy.
   b. Update map.
   c. Maintain safety of teams in field.
   d. Keep management informed and follow up "hot clues".
   e. Debrief teams and evaluate with Plans Officer and/or Search Manager.
3. **Logistics**
   a. Secure safe return of all forces at end of assignment.
4. **Coordination**
   a. Confer with Air Operations Officer.
   b. Attend all conferences.
   c. Brief replacement.

Air Operations Officer
Get briefed by Search Manager or Plans Officer.

1. **Initial phase**
   a. Assist in developing search strategy.
   b. Insure communications between air and ground.
   c. Establish landing zones.
2. **Operations**
   a. Brief air units, implement search strategy.
   b. Maintain air search safety.
   c. Insure adequate air units and support for mission.
   d. Keep Search Manager and Plans Officer informed.
   e. Debrief and evaluate.
   f. Update weather daily.
3. **Logistics**
   a. Establish air traffic control as necessary.
   b. Arrange for fuel and maintenance.
4. **Coordination**
   a. Confer with Ground Operations Officer.
   b. Attend all conferences.
   c. Brief replacement.

Support Services

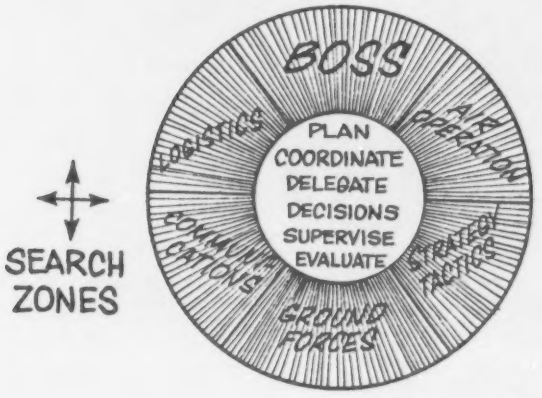
Provide maps of search area to staff and set up base.

1. **Personnel control**
   a. Sign in SAR units.
   b. Provide personnel information to staff.
   c. Update list of personnel daily.
   d. Arrange for medical treatment as necessary.
2. **Transportation**
   a. Provide traffic control as necessary.
   b. Close search area as necessary.
   c. Provide parking areas.
   d. Arrange all transportation.
3. **Logistics**
   a. Obtain, log and account for all material.
   b. Arrange food and lodging as necessary.
   c. Account for any funds and transactions.
   d. Provide secure area for family as necessary.
4. **Coordination**
   a. Attend all conferences.
   b. Brief replacement.

Unit Leaders

Get briefed by Ground Operations Officer.

1. **Preparation**
   a. Select team members.
   b. Obtain equipment, radios, special gear as necessary.
   c. Assure team readiness.
2. **Operations**
   a. Assume responsibility for assignment.
   b. Brief team.
   c. Keep Ground Operations Officer informed.
   d. Direct effective completion of assignment.
   e. Maintain team safety.
3. **Coordination**
   a. Debrief team and evaluate with Ground Operations Officer and/or Plans Officer.
   b. Log in and return equipment, radios, special gear.



SEARCH ZONES

Base Camp Administration

1. **Types of camps**
   a. **Portable camp** — set up for one or two day duration.
   b. **Base camp (fixed base)** — set up in anticipation of several days' use. This camp is more elaborate and better equipped.
   c. **Spike camp (semi-fixed base)** — small camps nearer the search area, usually servicing a sector or division of a search.
   d. **Staging area** — a base camp set up to specifically process and transport men, equipment, and supplies to and from a large search or complex of searches. Frequently near a fixed central facility such as a National Guard Armory or DES facility.
2. **Functions of a search base camp**
   a. To establish a **command post.**
   b. To serve as a **staging area** for men and equipment that are providing logistical support to the search area.
   c. To establish a **communications center** for the line organization and for the service organization.
   d. To supply **basic personnel needs** — rest and subsistence, sanitation facilities, first-aid, commissary, timekeeping, news, etc.
   e. To establish a **transportation depot.**
3. **Base camp location considerations**
   a. **Environmental constraints** of the selected site and search area. Consult the multiple use plan, land use plan, or any other similar survey that is currently in use for the area.
   b. **Ownership of the land.** You must first secure permission if the location is on private land. Obtain a written agreement and written release.
   c. **Terrain.** Safety, and environmental limitations such as slope and vegetation must be considered.
   d. **Ready access.** Consider the distance supplies must be transported. Consider transportation routes to the search area, supply sources, etc. Obtain permission to travel over private lands.
   e. **Communication.** Consider the necessary communications that will be needed to the search area dispatch office, within the base camp (radio, telephone service), and to the search area.
   f. **Safety and sanitation.** Keep the welfare of search personnel in mind.
   g. **Adequate space.** Avoid congestion and disturbances to camp activities. Estimate the duration of the search, and allow for expansion.
   h. **Proximity to search area.** Safety, sanitation, and travel time for search personnel should be considered.
   i. **Shelter.** From the elements — wind, sun, rain, snow, etc.
   j. **Security.** For government and personal property.
   k. **Aesthetic values.** Consider the temporary and permanent effects on the area used.
   l. **Public interference.** Consider the proximity to concentrations of people, job seekers, curiosity seekers, etc.

3. **Base camp location considerations *cont.***
   m. **Water supply.** Is it potable? Could it become contaminated? If unsure, have the water supply checked by public health officials or make other arrangements.
   n. **Existing facilities.** Are they of value or are they a hindrance to your overall needs. Example: Communications — Are there other CB radio operators in the area? Sanitation — condemned outhouses? Shelter — unsafe barn?
   o. **Aerial photo of the area.** Use to plan a base camp layout. It is easier than just letting it grow, unorganized.
   p. **Size and character of search.**
   q. **Expected duration.** Project an initial forecast, but plan for additional space for expansion to optimum size should it become necessary.
   r. **Dispersion of searchers.** Consider the use of spike camps.
   s. **Manpower and equipment.** Types to be used on search.
4. **Factors to consider when designing a base camp layout.**
   a. **Parking.** For vehicles and heavy equipment. Keep them separate from supply depot areas to enhance security.
   b. **Fuel storage and vehicle maintenance area.** Post "no smoking" signs.
   c. **Storage and supply depot.** Provide access and security.
   d. **Crew assembly and briefing area.** Consider including a bulletin board and warming fires.
   e. **Sleeping areas.** You will need separate areas for day and night search personnel and for the overhead team.
   f. **Latrines.** Consider separate facilities for women and men. They must be at least 150 feet or more from a water source and, 300 feet and downwind from the kitchen area. Make sure latrines are accessible to sleeping area.
   g. **Wash-up and showers.** A requirement in poison oak/ivy regions.
   h. **Heliport or helispot.** It is illegal to approach or take off over the base camp.
   i. **Search command post.** It should be somewhat isolated, away from the routes of travel by persons or vehicles and away from interrupting noises.
   j. **First-aid stations.**
   k. **Kitchen or mess.** The location will be somewhat dependent on how the food is to be prepared and served.
5. **Relationships of base camp functions.**
   a. What activities could be grouped together in a camp?
      - Command and plans.
      - Command and communications.
      - Latrines, sleeping areas, wash area, etc.
   b. Which areas need to be the most isolated?
      - Sleeping areas.
      - Command.
      - Helicopter and helispot.
   c. Which areas need access to transportation facilities?
      - Supply.
      - Equipment area.
      - Kitchen.
      - Garbage.
      - Latrines (chemical toilets).

5. Relationships of base camp functions *cont.*

d. What is the desired flow of personnel through camp? Straight lines are the most natural paths for search personnel minimizing walking in dust or mud.

e. What is the reasonable distance between functions? Depends upon the complexity of the search. Small base camps versus large staging areas.

f. What are physical factors which must be considered? Physical limitations and capabilities are:
- Size and shape.
- Terrain.
- Existing roads.
- Existing facilities (i.e., buildings, structures, communications, water, and sanitation facilities).
- Sun, dust, mud, etc.

g. How should the water supply be established?
- Water for the kitchen must be adequate and safe.
- Locate above other camp facilities.
- Protect the area from contamination by signing.
- You may need to dig out source and install plastic pipe hose.

h. How should the kitchen be located?
- Level.
- Good drainage away from camp area.
- Minimize dust.
- Adequate water supply.
- Good shade.
- Good lighting.
- Cooking, serving and eating areas together.
- Access by freezer truck or other cold storage.
- Rope off area to unauthorized personnel.

i. How should the equipment depot and supply storage area be located?
- Adequate space, secured and roped off.
- Segregate supplies and equipment by type and condition.
- Bins or stalls will aid your "check-out" and "check-in" system.
- Provide parking space for trucks, buses, etc.

j. How should sleeping areas be established?
- Downstream from kitchen water supply.
- Away from dishwashing drainage.
- Quiet area away from kitchen, trucks, roads, heliports, etc.
- Shaded area for night searches.
- Mark or sign separate areas for various search units, if desired.
- Provide for search manager and overhead team wake-up calls.
- Designate and supervise areas for warming fires.
- Provide clothes lines.
- Provide drinking water.
- On flat dry ground.
- Free of snags and other hazards to safety.

5. **Relationships of base camp functions *cont.***

k. How should the timekeeping or sign-in area be located?
- Should be placed near the entrance to the camp.
- Provide for lights.
- Provide tables, seats, shelter and roped off.
- Away from dust and noise.

l. What function should the commissary be close to?
- Locate with the time recorder.

m. Where should the communication area be located?
- Away from timekeeping, kitchen and equipment areas.
- Convenient to the search manager.
- If possible, have radio technicians help locate the site.

n. Where should the first-aid station be located?
- In a quiet area and dust free.
- Provide for shade.

o. Where should the search manager and overhead team be located?
- Isolate them away from main camp activity.
- Tables, chairs, lights, and heat (in cooler areas) are a must.
- Convenient to communications.
- Provide shelter.

p. How should wash-up and showering facilities be located?
- Well drained, sand or gravel.
- Adequate lighting.
- Away from the kitchen.
- Provide hot water, benches, basins, soap, towels, and garbage cans.
- Separate facilities for men and women, or arrange a schedule for use at separate times.
- Have clothes lines available.

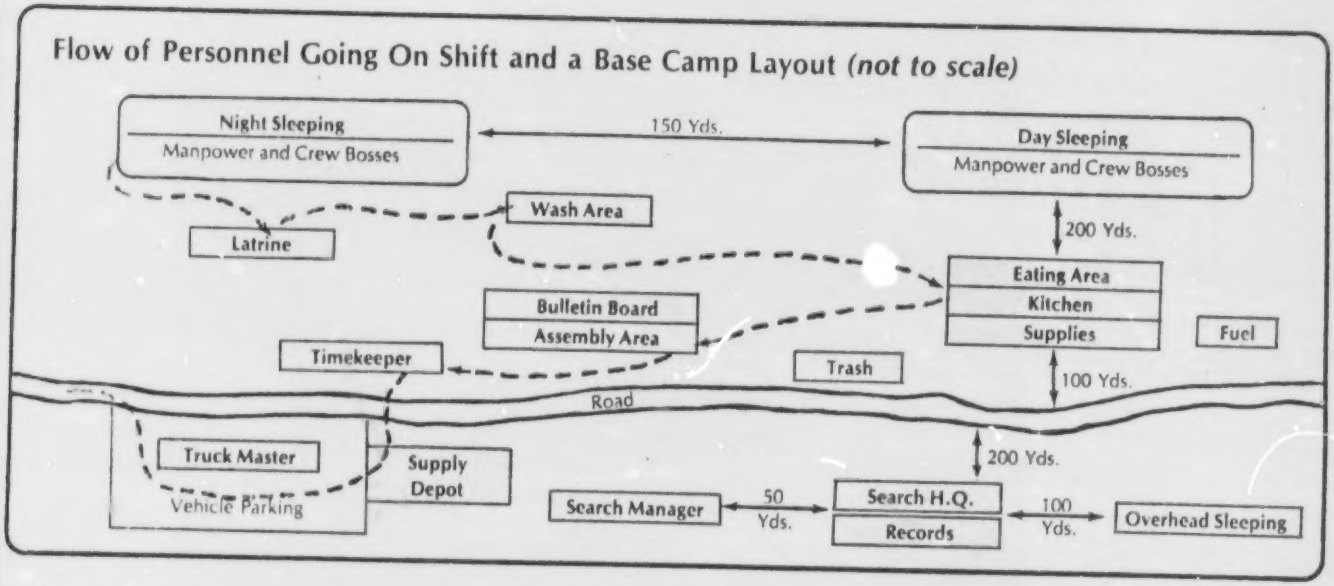
q. How should latrines be established?
- 150 feet from streams and 300 feet from kitchen, as a minimum.
- Post direction signs.
- Lighted for night use.
- Supply with tissue, shovel, and chlorinated lime.
- Cover with dirt and level when closing camp.
- Use chemical toilets whenever possible.
  - — Arrange for service at least once daily.
  - — Locate two latrines near the search command area.
  - — Provide occupied signs or mark them men/women.

r. How should garbage disposal be handled?
- Have cans distributed throughout the camp. Frozen meal boxes make good garbage containers.
- Haul the garbage out daily.
- Check agency policy before burning or burying garbage.

s. How should parking for searchers be handled?
- Have vehicles turn around first and park facing the exit.
- Keep the turnarounds clear.
- Consider vehicles with side opening doors.

t. What are considerations for an assembly area?
- Have adequate space available to assemble people for general announcements.
- Provide a bulletin board.
- Install a P.A. system, if necessary.

Flow of Personnel Going On Shift and a Base Camp Layout *(not to scale)*



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Briefing

What information needs to be presented?

1. **Subject information.** All information about the subject that will help the searcher recognize the subject, find clues, or determine the subject's behavior, such as:
   a. Physical description
   b. Clothing and equipment
   c. Physical condition
   d. Mental condition
   e. Behavioral traits
2. **Vital concerns.** Medicine the subject may be in need of, etc.
3. **Clue considerations.**
   a. Sole pattern of footwear
   b. Items carried by subject that could be dropped or left behind
4. **Subject's trip plans.**
5. **Terrain hazards,** if any, in assigned search area.
6. **Weather** in assigned area.
7. **Equipment needed by searchers.**
   a. Clothing
   b. Safety equipment
   c. Food and water
   d. Recording equipment
   e. Specialized equipment
   f. Other
8. **Communication details.** Call numbers, use of codes, etc.
9. **Transportation details.**
10. **How long will the teams be out.**
11. **Overview of search progress to date.** The purpose here is to let team know how things are going, why things are being done the way they are, etc. It will make the team feel a part of the "big picture."
12. **Relatives or close associates.** Who they are and where they are located.
13. **Media procedures.** Where the media are located, who the media liaison is, instructions if searchers are contacted by media, etc.
14. **Explicit searching instructions** for team.
    a. Specific area, where to start
    b. Configurations, spacing, etc.
    c. Marking procedures
    d. Adjacent teams, etc.
    e. When to start, when to stop
    f. What to do if subject is found — alive, injured, dead; instructions on protecting the scene

These instructions are CRUCIAL. You must tell the leaders exactly what you want done, where and how. Failure to do this will compound itself in terms of deficiencies and gaps in the search plan implementation.

15. **Debriefing instructions.** Where it will be and when, who to report to.
16. **Safety instructions.** Helicopter, terrain hazards, snakes, weather, etc.

Another critical thing to emphasize in the briefing is clue awareness:

1. ***Stress searching for clues***
2. ***How to report clues***
3. ***Logging exact location and time found***
4. ***Protecting clue location for follow-up by trackers, dogs, etc.***

17. To other key individuals in the overhead team, briefings would convey specific information needed by each to perform his or her functions.

A Key Briefing Technique

In every case possible, distribute written briefing statements, task statements, diagrams, maps, photos, sketches, etc. to convey information. Examples are:

1. Photo of subject
2. Briefing statement photocopied
3. Sketch of sole pattern
4. Map reproduced showing assigned area and searching details

This requires adequate maps, materials and photocopying capability — in the base camp, sometimes involving difficult logistics. But the effects of having reliable information for search personnel to constantly refer to drastically reduce mistakes and omissions.

Debriefing

As a minimum, the following specific information should be obtained from the teams:

1. **Explicit coverage** that the team *actually* carried out.
2. **The POD estimate** for the effort. (Probability of Detection.)
3. **The location of any clues** located, regardless of how insignificant they may seem.
4. **Search difficulties** or gaps in coverage encountered.
5. **Hazards** in the area.
6. **Problems** encountered with communications.
7. **Suggestions, ideas, recommendations** for future searching efforts.

The crucial need is to get exact information on the area covered, spacing, gaps, and how effectively (POD) it was searched. The use of sketches, diagrams and maps in plotting this information is essential.

BRIEFING

– FOR EFFECTIVE TEAM EFFORT

EVERY ONE

NEEDS TO KNOW !

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Documentation

1. **Why do you need to document the entire search effort.**
   a. Assists with the on-going investigation effort.
      - Allows for personnel shift changes without a loss of continuity.
      - Documentation makes it possible to disseminate accurate information to searchers.
   b. Enables you to reconstruct the entire search at a later time.
      - For critique purposes.
        —What was right, OK, or wrong, and why.
      - To aid improvements.
        Documentation will show you aspects that need work in order to update the preplan and increase effectiveness on future missions.
   c. Protect you from law suits.
      - Court cases involving major searches are becoming more frequent.
      - Documentating the search effort will provide your defense evidence in court.
   d. Aids you in gathering data on subject behavior.
      - One of the most important methods of establishing probable search area.
      - Gathering subject behavior data through documentation will aid your next search.
2. **What should you document?**
   a. Documentation begins with the initial reports and ends with the revision of the preplan and follow-up on problems identified. *It is an ongoing process.*
   b. Keep a chronological log of all significant events, decisions, communications, etc.
      - Kept current by dispatchers and the maps and records persons.
      - Consider using specialized information units or assigning several people just to keep records.
   c. Other information and debriefing reports.
      - Team briefing and debriefing reports.
      - Maps.
      - Weather progress.
      - Details about clues.
      - All major strategy and tactics planning sessions.
      - Any injuries incurred by searchers.
      - Expenses.
      - Any lost or damaged equipment.
      - Rosters of personnel involved.
3. **How to document**

   Equipment and techniques used for detailed documentation.
   a. Tape recorders.
      - At meetings, briefings, debriefings, etc.
      - Voice activated kind with radios, telephones.
   b. Stenographers.
   c. Note takers.
   d. Key personnel carry small dictation units to record decisions, events, observations, thoughts that are otherwise often forgotten.
   e. Microcomputers.

Dealing with External Influences: Relatives — Media — Political Entities

A. General principles for dealing with *relatives*.

1. Do not ignore them. Take initiative, contact them.
2. At the base camp, locate them in a comfortable place, away from the center of activity.
3. Assign one person to assist them and to provide them with regular feedback on the progress of the search. The person selected for this responsibility should have sensitivity and training in dealing with grief reactions.
4. Keep them constantly informed. Do not make them come to you for information.
5. Relatives may insist on being involved, or otherwise feel a need to contribute. If so, find some simple base camp tasks for them to do.
6. Unstable relatives or friends should be headquartered away from the base camp. Idle comments by searchers or overheard radio messages can cause serious reactions.
7. Maintain an atmosphere of encouragement without building false hopes.
8. Do they wish to be contacted by the media? If not you have a moral obligation to keep the media away from them.
9. Brief all searchers as to the situation with relatives or friends, particularly the location and identification of those in the area. Warn searchers to avoid making idle comments.

B. General principles for dealing with the *media*.

1. Designate one person as the media liaison.
2. Try to confine the media to one location. Arrange times for media tours of the base camp/search area and consider forming a "media pool."
3. Brief all searchers as to the location of the media. Demand that no one but the media liaison make statements without permission.
4. Keep the media informed. Provide regular reports.
5. Be honest and factual, but *do not* speculate.
6. Prepare written media releases. Reduces the chances for inaccurate information being reported or misquotes.
7. As Search Manager, attend at least one media conference each day.
8. Give frequent reference and credit to the organizations involved with the mission.

C. General principles for dealing with *political entities*.

1. Agency policies may dictate how to deal with political influences.
2. Designate one person as the political liaison.
3. Take the initiative and keep them informed.
4. Recognize that everything becomes a bit more "touchy". However, if you are managing an effective operation, there should be little need for change.

Remember in dealing with external influences,
HONESTY REDUCES RUMORS!

Planning ahead is the key of effective rescue/recovery.

Rescue/Recovery

Five problem solving components of rescue:

1. **Notification** — location and condition of subject.
2. **Size-up** — gather total information about situation.
3. **Planning** — choose a course of action and several flexible back-up plans.
4. **Doing it** — use proper resources to implement skills and techniques in the field.
5. **Critique** — see post-mission.

The rescue plan must take these factors into account:

1. Condition of subject — Can he walk? Must he be carried? A litter case? Can he survive a leisurely evacuation or must it be fast?
2. Time of day — How much time is there for evacuation? How long will the evacuation take? Can you complete the technical part in daylight?
3. Weather — Can you rely on continued good weather? Must you bivouac? Can helicopters fly and land in the present weather?
4. Equipment available — What is needed? Can you improvise?
5. Evacuation route — What are the difficulties? Do you need route finders? Can a helicopter be used? What is the distance?
6. Personnel available — How many are there and what are their capabilities? What is their condition? Are support and back-up people available?
7. Other factors — Communications? Airdrops? Transportation?

The rescue plan must be based on, and stress, the following:

Safety — The rescue plan must be safe for the subject and the rescuers. There will always be an element of risk when working on a mountain, but the leader must plan a safe rescue, above all.

Simplicity — The rescue plan should be the simplest way to do the job. Avoid setting up elaborate lowering or raising systems if you see a simpler way. The less complicated the procedure, the less chance of something going wrong. It is well to remember that altitude and exhaustion may affect the rescuers' judgements and slow reaction time that may be necessary for difficult rescues.

Swiftness — There is usually plenty of time to evacuate a subject. However, the rescue plan should attempt to remove him in the shortest time consistent with safety and simplicity. Some injuries or medical emergencies (cerebral hemorrhage, poisoning, internal injuries, severe hypothermia, pulmonary edema, appendicitis, etc.) require immediate evacuation. The leader must recognize these emergencies.

Rescue/Recovery "Thought Provokers"

1. Use technical personnel for technical rescue.
2. If the subject is deceased, evacuate *only* if and when there is no risk to rescuers.
3. Stabilize the subject before evacuating, if possible.
4. Decide on the easiest route.
5. Appoint someone to serve as route-finder, with a radio and markers, to report potential hazards, problems, etc.
6. Use litter teams of 6-8 personnel. Normally, no more than 20 minutes per shift. You need three (3) teams minimum. You may also need others to carry other equipment.
7. Use common sense procedures to care for and protect the subject.
8. Have a radio man bring up rear.
9. If using a helicopter for evacuation, make sure:
   a. That the subject is informed and briefed.
   b. That the subject is protected.
   c. That someone goes with the subject who knows medically what has been done.

Medical Aspects for both the Subject(s) and Searchers.

All too often in the spirit and excitement during the wilderness search and rescue emergency we tend to overlook the monitoring of the health and safety of the SAR personnel responding. This outline is intended to provide the SAR manager with those factors that should be monitored during SAR operations.

Perhaps an additional overhead team position that should be considered would be that of a medical manager. The responsibilities of this position could include:

1. Monitoring condition of SAR personnel; prevent illness or injury and promote welfare and efficiency.
   a. To evaluate basic problems: medical (heat, cold, altitude, major trauma, fatigue) or situational (remoteness, topographic hazards, other personnel.)
   b. To promote prevention to include those things that the medical manager can do directly and indirectly to prevent environmental casualties, e.g., rest, food, shelter, water, gear, screening for possibly susceptible persons and base camp considerations.
2. Could evaluate the potential condition of the subject based on weather, health, age, etc., and advise further search planning.
3. Medical preplanning for when the subject is found; prepare for potential emergencies or problems involving the subject or SAR personnel.
   a. To identify basic resources: First-aid personnel, first-aid needs and available supplies, rescue and evacuation equipment, communications, transportation.
   b. To promote preparedness to insure that reasonable advanced preparations be made in the event there is an emergency involving a subject and/or searcher, e.g., special equipment, communications, personnel and transportation.

Medical Preplanning for the Subject

Questions: Where located, how do you acquire them and whom do you notify?

- Ambulances
- Doctors
- EMT's
- Minimum equipment
- Hospitals
- Special equipment

Where are sources of: Food, Water, Shelter. Are they permanent vs. portable? Is there adequate care for searchers?

Note: Every agency should establish direct contact with one or more doctors in their area who are experienced in dealing with environmental injuries and who will be available for emergency consulting.

Preparation: Evacuation vs. Treatment for the subject

How much treatment? Where? (base, field, hospital?) Who?

1. **Support:** Short term vs. long term
   a. Access to hazardous areas.
   b. Personnel, transportation, and extra supplies and assistance.
2. **Evacuation:** Land vs. Air
   Route finder, litter, thermos, lights, brush clearing, food, tarps, rope.

Prevention of Cold or Wet Searchers.

1. **Hypothermia**
   Causes: inadequate clothing, not enough calories, overloaded and/or poor physical condition.
2. **Food**
   Lots of calories (snacks, GORP); hot food and beverages.
3. **Shelter**
   Wind breaks, heat, opportunity to dry clothes.
4. **Water**
   Often dehydrated and salt-depleted; monitor constantly.
5. **Freezing injuries**
   Causes: constrictions, volatile liquids, poor insulation, getting wet.
6. **Clothing**
   Top layers in wet weather: rain gear and wool.
   Top layers in dry weather: wind gear and down.
   Underlayers: wool or synthetic wools, use layer method.
7. **Screen and monitor**
   Overweight, overloaded, overtired, not eating, mismatched teams, cotton clothes, "acetone breath" (ketosis).
8. **Treatment and preparation**
   a. Frostbite:
      Hot water source; basins and/or towels; thermometers.
      Protection and evacuation.
   b. Hypothermia:

Mild	Severe
• Dry clothes or bag	• Thermometer
• Stoves	• Bag
• Calories	• Litter
• Hot liquids	• IV (warm)
• Heat packs	• Evacuation
• Transport (?)	• Warm oxygen
• Warm oxygen	

Prevention of Overheated Searchers

1. **Heat stroke and heat exhaustion.**
2. **Water**
   Adequate supply, good quality, proper containers, water drops (where, when, how - "tanking up").
3. **Food**
   Fruits and juices, salty meats, snacks.
   Prevent food poisoning, salt tablets (1 cup water per tablet, chewed).
4. **Shelter**
   Shade and breeze, mid-day sleeping, patrol "varmints".
5. **Clothing**
   Covered head and limbs, natural fibers, sturdy foot gear.
6. **Screen and monitor**
   Overweight, over 50 years old, small stature, medical condition, nausea or vomiting, hangovers, severe sunburn, skin diseases, symptoms.
7. **Treatment and preparation**
   a. Heat stroke:
      Immediate treatment — water, ice, cotton blankets or clothing, thermometer; *speed essential.*
   b. Heat exhaustion:
      Salty liquids (broth or buffered salt tabs, anti-emetics); warmth and rest; IV last resort.

Prevention of Altitude Problems for Searchers

1. **Altitude**
   Mountain sickness, HAPE (high altitude pulmonary edema), cerebral edema.
   Causes: lack of adaptation to 6000'-9000' + heights, excess work (younger persons more susceptible).
2. **Food**
   High carbohydrates, high calories, appetizing and hot.
3. **Water**
   Often dehydrated (loss of 1 pint per hour via respiration).
4. **Shelter**
   According to weather, work high, sleep low.
   Base camp: support base, advance base (portable).
5. **Clothing**
   Prepared for cold, adequate for terrain.
6. **Safety and emergency gear** (as needed)
7. **Screen and monitor**
   Unadapted, overtired, overweight, headaches, nausea, coughs, vision changes, behavior changes, "acetone breath" (ketosis).
8. **Treatment and preparation:**
   Consult, evacuation to lower altitude (possible routes), diuretics.

Prevention of Trauma

Skill vs. Complexity of task, learning, biorhythms.
Caused by fatigue, task, heat, cold, altitude and wildlife.

Prevention of Fatigue

Sleep (schedule facility) and calories.
Avoid stress, haste, overloading, mismatched abilities, dehydration.

Snakebite

Antivenin, snow or ice, rest and transport.

Suspending the Mission

1. **The basic question to be answered is, are we searching at this point for a person who is most likely *deceased* or *living*?**
   There are four main considerations to be evaluated:
   a. What are the chances of the subject being alive?
   b. What is your assessment of search area coverage? (90%, 80%, or less?)
   c. At this point, what is your assessment of searcher safety?
   d. What is the *overall* family political climate? What pressures or counterpoints are being exercised?
2. **Factors to evaluate in considering suspension of a mission.**
   a. Increasing evidence that the missing person is not in the search area.
   b. Have all the search zones (area) been searched and researched?
   c. Has there been a thorough and effective execution of the search plan?
   d. The question of survivability of the missing person has been thoroughly researched and studied.
   e. The safety of searchers *does* or *does not* warrant further continued effort.
   f. Are there any unresolved or unanswered clues?
   g. Have your search resources been depleted? Is there increasing counter pressure to release searchers and their equipment? What is the availability of replacement resources?
   h. Is there political and/or family counterpressure to continue or maintain the search?
   i. Other SAR incidents occur (contemporaneous with your current efforts on the mission) and the *other* incident demands a higher priority (response).
   j. The current and forecasted weather has been examined in light of continuing the search.
   k. Are there any serious equipment malfunctions? i.e., a radio repeater.
   l. A continued search effort is no longer affordable or practical from a *cost* standpoint.
   m. Other??

Perhaps in analyzing your search data, relative to suspending or continuing the search, you notice that the search areas were really poorly defined.

Perhaps your assessment to continue or suspend is related to a combination of these or like factors. (Nothing significant in and of itself but, when viewed collectively . . .)

NEVER SEARCH PLAN BY YOURSELF!

3. **Use a group consensus technique** as a vehicle in helping you (as search manager) in making the final decision to, or not to, suspend the mission.

   Have each person review each of the significant factors, assign his percentage of probability or value ranking (scale 1 = low; 10 = high) or simply list for or against.

Example:

Factors	For	Against	Rank	Decide
1. Safety of Searchers	_____	_____	_____	_____
2. Weather	_____	_____	_____	_____
3. Unresolved Clues	_____	_____	_____	_____
4. Etc.....				

Make a decision *yes* or *no*. Then, before finalizing, consider one additional technique.

4. **Limited continuous search.**
   What and How?
   a. **Overflights** — over the search zone on an intermittent or infrequent basis.
   b. **Detection of clues** — a modest search effort for any "new clues", i.e., original search under snow cover. When snow melts—look.
   c. **Signs** — post signs at campgrounds and trailheads to inform the public that a person is missing in this area.
   d. **Inform public and media** — particularly people who may be going into the search area (i.e., during an impending hunting season.)
   e. **Use the search zone(s) for training exercises** — further ground search technique training programs could be conducted in search zone.
5. **Ideas and techniques for a final closeout debriefing session.**
   General debriefing techniques have been identified in the briefing-debriefing chapter.
   The final closeout or debriefing sessions that you, as search manager, hold with team leaders and/or overhead team members constitutes your final opportunity to gather the facts and suggestions you need in preparing for the search critique session.

Objective: Collect, record and exchange information on what happened during the search and assess effectiveness.
Consider these criteria:
a. Interview team leaders *one at a time*. Consider using a tape recorder, secretary, or other note taking aids.
b. Review the exact terrain covered, refer to maps, worksheets, logs.
c. Review the percent of coverage and configurations. Number of sweeps?
d. Identify any clues found during the search. By whom? Where?

(continued on next page)

(Consider these criteria cont.)

e. Discuss any hazards (searcher) observed. Safety?
f. Give instructions on *what* to do *now*, including any assistance needed for search critique. Appear? Write up report on team's actions?
g. Discuss how each leader performed. How did I do as search manager? How well did "we" do as a team?
h. Discuss feedback. Too little, too late? Just right?
i. Other operation concerns or events relative to the team leader's operation. i.e., Dog handler, etc.
j. Identify what is needed to improve? Minimum standards? Physical fitness? Practice? etc.
k. *Summarize* information obtained from debriefing. *Evaluate* new things you tried, trends, common problems.

This information will form an important base for the search critique.

Remember to keep records on all the information pertaining to your decision to (or not to) suspend the mission.

Demobilization

Formal demobilization planning should begin well within the first-half of the expected duration of the mission.

The Demobilization Plan

Plan Preparation — The demobilization plan is prepared by the Plans function in close coordination with the Demobilization Coordinator and other top search overhead personnel.

The demobilization plan consists of six parts:

1. **General information**
   Includes orientation information and general discussion of the demobilization procedure to be followed. May include overall situation information or specific instructions.
2. **Responsibilities**
   Spells out the responsibility for the plan initiation and specific responsibilities by name for various implementation activities. Establishes a chain of command and outlines the activities at each location or processing point. Determines who is in charge at each location or processing point.
3. **Release priorities**
   Release priorities will be determined by the search manager depending on the situation and by the support services function depending on transportation availability. Late night releases or travel should be avoided. Always try to release resources in "good condition", rested, showered, fed, etc.
4. **Release procedures**
   This section spells out the various steps in the release procedures (e.g., Plans: to support services, to bus loading area, to showers, to home, etc.) *Be specific!*

(continued on next page)

(Demobilization Plan Preparation cont.)

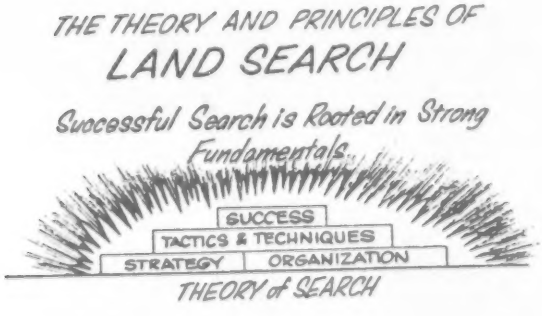
5. **Use organization and flow charts**
   Include: forms to be used, anticipated travel or standby times, routes and methods of travel, procedures to take place at each stop and any other instructions that may prove useful in preventing confusion.
6. **Directory**
   Telephone directory, maps, routes of travel, etc.

Too often there is little or no planning for demobilization, or it comes too late. Things often are left to simply fizzle away. This can result in incomplete information, missing equipment, leaving the resources with a poor image of the agency in charge and many other problems.

Post-Mission

Post-Mission Tasks

1. **Final paperwork**
   a. Mission reports
   b. Press release
   c. Appreciation letters
2. **Claims**
   a. Proper documentation
   b. Types: Injury, property loss, damage, expendable supplies, out-of-pocket expenses.
3. **Replace equipment**
4. **Critique**
5. **Follow-up tasks**
   Determine what needs to be done, assign jobs with a completion date.
6. **Revise preplan**



Request for Helicopter Air Support

Local Mission # _____

AFRCC Mission # _____

Date: _____ **Time:** _____

1. Give your name, agency and phone number.

2. SAR Objective: Vehicle _____ Person _____

Boat _____ Other _____

3. Remarks: *Describe the situation requiring air support,* because of non-availability of medical or ambulance facilities. Are other land transport or local resources usable? NOTE: Insure that commercial land or air resources are *not* available, timely, or qualified for mission. _____

_____

_____

_____

4. Subject Information:

Name _____

Age _____ Address _____

_____

Last known position: Sea Grid _____

Latitude/Longitude _____ Time _____

Destination _____

Condition (Description of injuries) _____

_____

5. On-Scene Situation: Give as much information as possible. (Who is on-scene? How many people? Are there qualified medical personnel on-scene?

_____

_____

_____

6. Pickup Area:

Weather _____

Temperature _____ Cloud Cover _____

Height of clouds above ground and or peaks _____

Elevation _____ How Marked _____

Helipad or Landing Zone Location _____

Snow Depth _____ Wind (velocity/direction) _____

Landing Zone Hazards (trees, wires, etc.) _____

_____

7. Delivery Area: (same information required as in #6)

Location _____

How Marked _____

Weather _____

Temperature _____ Wind _____

8. Air miles from delivery area to pickup area: _____

9. JP4 or JP5 Source: _____

10. Medical Information:

On-Scene Physician _____

Phone _____

Receiving Physician _____

Phone _____

Location/Agency _____

Phone _____

Special medical equipment required? _____

_____

11. On-Scene Communications:

Type: (AM or FM) _____

Frequency _____ CB Channel _____

Selecting Helicopter Landing Zones

DO . . .

1. Remember that a touchdown area 30 by 33 steps is only large enough for landing. It is not large enough to take off from or turn around in.
2. Attempt to find a large area that will permit a 15 degree approach angle and a 15 degree take off angle.
3. Remember that the higher the barriers, the longer the landing zone must be.
4. Attempt to find a landing zone that is oriented with the long axis generally into the wind.
5. Remember that wires are difficult for the pilot to see when approaching a landing zone.
6. Clear the touchdown area of the landing zone of all obstacles higher than one foot.
7. Remove all loose brush and debris from areas that helicopters may be landing in, hovering around, or taking off from. Secure equipment, tents, ground clothes, etc.
8. Mark landing zones correctly.
9. Learn the proper hand signals to assist the pilot in landing.

DON'T . . .

1. Leave loose brush and debris in landing zone.
2. Try to get more aircraft into a landing zone than it can safely accommodate.
3. Forget to clear the touchdown area of all obstacles higher than one foot.
4. Choose a landing zone that is not generally oriented with the long axis parallel to the wind direction.

Helicopter Safety Rules

1. All personnel should stay at least 50 feet from small helicopters (two to three place models) and 100 feet from larger models, unless directly part of the authorized crew working with the craft.
2. Always approach or leave the helicopter from near the front so the pilot can see you at all times.
3. Rotor blade sailing—in windy conditions a blade can drop down low without warning. Do not approach or leave without pilot's approval.
4. Keep your head down at all times. Remember that the slower the rotor is moving, the lower it will dip.
5. Never approach or leave a helicopter from any side where the ground is higher than where the helicopter is standing—you may walk into a rotor. Approach and leave downhill.
6. No smoking within 100 feet of helicopters.
7. Remember that under many circumstances of visibility and viewpoint a helicopter tail rotor cannot be seen due to its high speed. Maintain a wide clearance from the tail area and do not stoop or walk under the tail boom.
8. Personnel working with helicopter should wear hardhats with chin straps fastened, goggles and bright jackets or vests.
9. Passengers should wear hardhats with chin straps fastened at all times and seat belts secured until pilot okays removal.

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(Helicopter Safety Rules *cont.*)

10. Keep long handled tools, ice axes, skis, litters, radio antenna and similar items low and parallel to the ground when approaching or leaving helicopter.
11. Ropes should be coiled and secured. Loose, light items such as sleeping bags and parkas and small pieces or gear should be secured in packs or bags.
12. Do not load without pilot's supervision, as only he can best judge weight distribution and proper tie-down methods. Keep tie-down straps short to eliminate loose ends which might get tangled in control cables or motor. Re-secure tie-down straps after unloading.
13. Passengers should not enter helicopter until pilot gives okay. Enter carefully so not to interfere with controls, cables and pilot. Do not touch any moving parts.
14. Do not exit until pilots gives okay. Ground personnel should not approach helicopter until engine is off and rotors stopped or pilot signals okay. Even after touchdown pilot may want to shift helicopter's position.
15. Never stand directly beneath helicopter or its takeoff or landing pattern unless directly authorized to hook sling loads.
16. At takeoffs and landings all personnel should be well away from helicopter and facing away. Main rotors may dip to one side as craft moves and tail rotor may swing around. Trained crewmen should be in control to signal pilot and keep personnel away.
17. Do not touch hoists, slings, aircraft until contact with ground has been made due to static electricity buildup.

HELICOPTER CRASH PROCEDURES

Crash situations are rare but chances of survival are greatly increased by following these rules:

1. Keep safety belt tight at all times.
2. Keep hardhat on and chin strap fastened at all times.
3. Throw out heavy gear *only if* instructed by crew.
4. If instructed by the crew that the aircraft is undergoing an emergency assume the following position:
   a. Bend forward at the waist with feet planted firmly on floor.
   b. Rest chest on knees and enfold and lock the arms around and behind the thighs.
5. Remain seated with seat belt on until rotors stop.
6. Do not leave the aircraft until instructed unless fire or other circumstances force such action.
7. Remain well clear of aircraft after exiting and do not return to recover equipment left behind.

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BARRIERS TO PROGRESS

- Tradition
- Inaccurate Data
- False Economy
- Poor Training
- Afraid to Take Risks

JOB of the SEARCH BOSS (mgr.)

- RECOGNIZE THAT YOU ARE IN CHARGE
- YOU ARE RESPONSIBLE FOR GETTING THINGS DONE... Through / with people